

THE PAN-PACIFIC ENTOMOLOGIST

Published by the
Pacific Coast Entomological Society
in co-operation with
The California Academy of Sciences

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San Francisco, California

1927

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in July, October, January and April by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Annual subscription \$2.00 in advance for the United States and Canada; \$2.25 for foreign countries. Subscriptions should be sent to the treasurer, Dr. Stanley B. Freeborn, University Farm, Davis, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

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Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.

The Pan-Pacific Entomologist

Vol. IV, No. 1

July, 1927

SYNONYMIC NOTES (LEPID., PHALÆNIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

Through the kindness of Mr. W. H. T. Tams we have received a copy of "Notes on the Synonymy of Some Noctuidæ" published 1926, *Encyclopedie Entomologique*, Lepidoptera, I, Fasc. 4, pp. 183-185. In this paper Mr. Tams has published notes of great value on the types of some heretofore unplaced or misapplied names. As this paper seems unavailable to most American workers, we think best to call attention to the new synonymy in relation to North American species.

"AGROTIS" ANTEPOSITA Gn.

1852, Guenée, *Spec. Gén.*, V, Noct., I, 278, *Agrotis*.

Mr. Tams remarks that the Paris Museum type is a fragment of the thorax bearing two wings on one side. He states it is certainly not *Feltia annexa* Treit., and thinks it may be "*Lycophotia*" *messium* Gn.

As the species was described from two specimens, one of which was in the Boisduval collection, the second type may possibly be in existence and may be in condition to allow positive determination.

HADENA¹ LUTRA Gn.

1852, Guenée, *Spec. Gén.*, VI, Noct., II, 94, *Hadena*.

1906, Hampson, *Cat. Lep. Phal. B. M.*, VI, 333, *sepultrix*, *Eumichtis*.

¹ *Hadena* Schr., type *Phalæna cucubali* D. and S. Much has been written regarding *Hadena* and its type. Duponchel, 1829, *Lep. Fr.*, VII, (2), 71, cited *genistæ*, but this is not an included name. Curtis, 1830, *Brit. Ent.*, I, 308, cited *capsinicola* also a non-included name. Boisduval, 1836, *Sp. Gen.*, I, 135, cited *dentina* and on page 144 cited *satura*, both non-included names. Westwood, 1840, *Gen. Syn.*, page 95, cited *plebeia*, a non-included name. Guenée, 1852, *Sp. Gen.*, VI, 81, cited *w-latinum* presumably for synonym *genistæ* following Duponchel, but neither name included in Schrank's generic description. Grote, 1874, *Bull. Buff. Soc.*, II, 14, did not designate a type, but in 1895, *Ent. Rec.*, VI, pages 78 and 284, cited *cucubali*, which he also cited in several subsequent papers. Hampson, 1894, *Fauna Brit. Ind.*, Moths, II, 198, designated type *cucubali*, the first designation of an included name which we have been able to find. Hampson, 1903, *Cat. Lep. Phal.*, IV, 4, cites type *reticulata* presumably for synonym *typica* Auct. and Hbn. nec L., and repeats the citation 1905, l. c., V, 208. Warren, in Seitz, III, 79, follows Hampson.

Fortunately the prior designation of *cucubali* eliminates the nomenclatorial question if *typica* Auct., a probable misdetermination,

- 1926, Tams, Encyc. Ent., Lepid., I, (4), 184, (= *glaucopis*), *Polia*.
 ‡ *brassicæ* Auct. nec L.
 1873, Grote, Bull. Buff. Soc. Nat. Sci., I, 104, *Mamestra*.
lubens Grt.
 1875, Grote, Trans. Am. Ent. Soc., V, 113, *Mamestra*.
rufula Morr.
 1875, Morrison, Proc. Acad. Nat. Sci. Phila., p. 62, *Mamestra*.
race glaucopis Hamp.
 1905, Hampson, Cat. Lep. Phal. B. M., V, 106, pl. LXXXI, 6, *Polia*.

We know of no good character to sort *glaucopis*, which is only western *lubens*, from typical *lubens*. Western specimens are often darker in color than some eastern specimens, but the character does not hold for any series.

Mr. Tams reports *lutra* as being from North America instead of from New Holland. In view of the early date of the Guenée name, the comparative rarity of *glaucopis* in collections, the fact that we cannot tell *glaucopis* from *lubens* with any certainty save from locality labels, coupled with the fact that two other supposedly New Holland species described by Guenée from Paris Museum material turn out to be from eastern North America, leads us to think that *lutra* is, in all probability, based on an example of eastern *lubens* rather than *lubens glaucopis*.

MYTHIMNA² MARYX Gn.

- 1852, Guenée, Spec. Gén., V, Noct., I, 344, *Ceramica*.
 1905, Hampson, Cat. Lep. Phal. B. M., V, 610, unrecog., *Ceramica*.

could possibly become a genotype, to say nothing of this resting solely on the strength of the citation of *reticulata* which is a non-included name.

McDunnough, 1916, Ent. News, XXVII, 395, follows Grote, but does not use the name for North American species for taxonomic reasons.

In all probability *lutra* (*lubens*) is not strictly congeneric with *cucubali*, but quite a number of the species assigned to "Polia" by Hampson and McDunnough do seem to belong, so that we simply substitute *Hadena* for "Polia," following Hampson's taxonomy, until some logical division of "Polia" is proposed. In reality *Polia* is a *Tentamen* genus of *Cucullinæ*, instead of belonging in the *Hadeninæ*.

² *Mythimna* Ochs., type *Phalæna albipuncta* D. and S. We cannot agree with Dr. McDunnough's citation of *oxalina* as type based on a "restriction" method of fixation (1916, Ent. News, XXVII, 395). By this method the type would appear to be *acetosellæ* D. and S., that name as well as *oxalina* being listed by Hubner (Verz.), and designated by Grote, 1874, Bull. Buff. Soc., II, 24. We have found no designation of *oxalina* prior to 1903, Hampson, Cat. Lep. Phal., IV, 602. Hampson cited *oxalina* following his "first species" rule, and in this is followed by Warren, in Seitz, III, 61. Westwood, 1840, Gen. Syn., page 94, cited *turca*, but this was *ultra vires* in view of the fact that Duponchel, Lep. Fr., VII, (2), 71, had designated type *albipuncta*. Guenée, 1852, Spec. Gén., V, Noct., I, cited *imbecilla* = *disparilis*. Barnes and Benjamin, 1926, Ent. News, XXXVII, 79, cited type *albipuncta* following Duponchel.

1926, Tams, Encyc. Ent., Lep., I, (4), 184, (= *rubefacta*), *Sideridis rubefacta* Morr.

1874, Morrison, Can. Ent., VI, 249, *Ceramica*.

‡ *vindemialis* Grt. (nec Gn.).

1875, Grote, Proc. Acad. Nat. Sci. Phila., 418, *Mamestra*.

1880, Grote, Can. Ent., XII, 185, (partim.), *Mamestra*.

1881, Grote, Can. Ent., XIII, 124, (partim.), *Mamestra*.

1905, Hampson, Cat. Lep. Phal. B. M., V, 442, *rubefacta*, *Sideridis*.

Grote, 1875, described *vindemialis* n. sp., 1880 and 1881. Grote credits authorship to Guenée. We cannot state if the 1875 n. sp. is an accident, or if Grote had previously determined a Thaxter specimen as the Guenée species and later forgetting the existence of the Guenée names published as "n. sp." There are two species much alike in superficial appearance but differing structurally.³

PLATYPOLIA⁴ ANCEPS Steph.

1850, Stephens, Cat. Lep. B. M., p. 285, *Miselia*.

1918, Barnes and McDunnough, Contrib., IV, (2), 101, *Eurotype*.

‡ *polymita* Auct. nec L.

1829, Stephens, Ill. Brit. Ent., Haust., III, 31, pl. XXVI, 2, *Polia acutissima* Grt.

1875, Grote, Check List Noct. Am., p. 23, pl. I, 9, *Pachypolia form aplectoides* Gn.

1852, Guenée, Spec. Gen., VI, Noct., II, 83, *Hadena*.

1926, Tams, Encyc. Ent., Lepid., I, (4), 185, (= *medialis*), *Eurotype confragosa* Morr.

1874, Morrison, Proc. Bost. Soc. Nat. Hist., XVII, 138, *Polia medialis* Grt.

1876, Grote, Ann. Lyc. Nat. Hist. N. Y., XI, 306, *Polia*.

The specific synonymy has been explained by Barnes and McDunnough, 1918, save for the name *aplectoides*. Mr. Tams states this latter name, based on another "New Holland" type in the Paris Museum, is the same as *medialis* Grt.

³ We possess a specimen from Florida which agrees well with Hampson's figure of *vindemialis* Gn. (1905, Cat. Lep. Phal. B. M., V, 445, pl. XCI, f. 2 type). The name has been omitted from the Barnes and McDunnough check list because Hampson stated that the locality, Florida, given by Guenée, was presumably an error and that the species probably came from New Zealand. We tentatively place *vindemialis* Gn. in *Barathra* Hbn., type *albicolon* Sepp cited by Grote, 1895, Abh. Nat. Ver. Bremen, XIV, 71. According to Hampson's taxonomy *Barathra* will replace *Trichoclea*. We have had no opportunity to study the European *albicolon* in relation to North American species.

⁴ See Barnes and Benjamin, 1926, Pan.-Pac. Ent., III, 71, for generic synonymy.

NEW PHALÆNIDÆ (LEPID.)

BY WILLIAM BARNES AND F. H. BENJAMIN

*Decatur, Illinois***Mesembragrotis** Barnes and Benjamin, gen. nov.Type *Mesembragrotis ruckesi* sp. nov.

Proboscis fully developed; palpi upturned, extending about equally with the frontal armature, the second joint scaled and not conspicuously fringed with hair, the third, moderate, porrect; frons with a truncate conical prominence with a flat vertical corneous process at middle like a beak; eyes rounded, naked, unciliated; antennæ of male scarcely serrate, fasciculate, laterally doubly fasciculate from each joint; antennæ of female simple, ciliated; head and thorax clothed with broad serrate scales, with very little hair; prothorax with a slight spreading crest; mesothorax with double tufts; metathorax with a large scale tuft; all tibiæ strongly spined, the fore tibiæ also armed distally with two heavy claws on each side. Fore wing with veins 3 and 5 from close to the angle of the cell, 6 from somewhat below upper angle; 9 from 10, anastomosing with 8 to form the areole; 11 from cell. Hind wing with veins 3, 4 from angle of cell; 5 obsolescent from somewhat below middle of discocellulars; 6, 7 stalked or connate, variable individually.

Presumably allied to *Mesembreuxoa* Hamps. but differing on palpi, antennæ, vestiture, and probably also on tibial armature.

Mesembragrotis ruckesi Barnes and Benjamin, sp. nov.

Head and thorax mixed black, rufous and ochreous; collar with more or less of a transverse black stripe. Fore wing with ground color grayish ochreous, more or less heavily shaded and powdered by black and appearing quite dark; basal line indicated on costa; t. a. line blackish, waved; claviform long, black outlined; orbicular irregularly ovate, variable in exact shape, black outlined; reniform irregular, whitish, black outlined, with more or less of a dusky crescent which may or may not have a paler center; t. p. line black, produced to points on the veins, bent outward on costa, more or less incurved in discal fold, and more strongly so in submedian fold; s. t. line dentate, outwardly defined by a pale shade; a terminal series of black points. Hind wing white tinged with fuscous especially on veins and toward the termen.

The species has much the appearance of a "*Euxoa*" of the *tessellata* group.

Type locality: near Alpine, Texas (O. C. Poling).

Number and sexes of types: Holotype ♂, 1-7 September, 1926; allotype ♀, 22-31 August, 1926; 6 ♂ 10 ♀ paratypes, 22-31 August and 1-7 September, 1926.

NACOPA B. and Benj.

Type *Acopa bistrigata* B. and McD.

1924, B. and Benj., Contrib., V, (3), 151.

We commented upon this genus in our original description. The types of *bistrigata*, and only examples known to us were both rather poor and considerably rubbed. From a series of another species, described below, and which seems surely closely allied, we would now place the genus in the Cuculliinæ, as the eyes appear distinctly lashed, the lashes long but probably easily broken off.

In the Cuculliinæ *Nacopa* seems to have no close allies. We are inclined to place it near *Euros* Hy. Edw. mainly because of its Heliothid habitus.

Nacopa melanderi Barnes & Benjamin, sp. nov.

Male. Mouse gray irrorated with white; fore wing with basal line as a white dot on costa; t. a. line as a white w-mark; t. p. line white, nearly erect, joined by a curved white mark in cell which takes the place of a reniform and isolates an irregular spot of ground color; s. t. line white, waved from costa to inner margin; fringe pale, checkered. Hind wing pale gray.

What we take to be females of the same species are two specimens possessing exactly the same markings as the males, but with the ground color bright rufous.

The species is closely allied to *bistrigata*, but the male antennæ are strongly serrate. In *bistrigata* there appears to be only two transverse white bands because the upper part of the t. p. and the lower part of the s. t. lines are practically obliterated, while the upper part of the s. t. line is practically joined to the lower part of the t. p. line, thus parts of two lines form a single line. The name *bistrigata* is obviously based on this line and the t. a. line. *N. melanderi* clearly shows three distinct transverse white lines isolated by ground color.

Type locality: near **Alpine, Texas** (O. C. Poling).

Number and sexes of types: Holotype ♂, 8-14 July, 1926; allotype ♀, 1-7 April, 1926; 13 ♂ 1 ♀ Paratypes, various dates of May and July.

"Polia" *buscki* Barnes and Benjamin, sp. nov.

Hair on eyes present but rather sparse.

Male. Antennæ ciliated, the joints slightly marked. Ground color of head, thorax and fore wing dull olive gray tinged with brown and

irrorated with black; base of wing blackish; basal line irregular, mainly visible as a filling of ground color; t. a. line waved; orbicular round, minute, more or less obsolescent, surrounded by a black ring; reniform large, poorly defined, almost as a blotch; median area of wing black; t. p. line produced to points on the veins, oblique on costa, excurved about cell, incurved in submedian fold; s. t. line waved, pale, inwardly marked by some black more or less tending to form sagittate marks, outwardly marked by diffuse black shades; an obsolescent terminal line; fringes luteous at base, with black inter-line and checkering, and pale tips. Hind wing nearly pure white, without discal spot or transverse line, the veins slightly tinged with fuscous. Beneath: white, powdered with fuscous along costal margins.

Female. Similar, but with hind wing more clouded with fuscous.

We know of no closely allied North American species, and suggest placement following *marinitincta*.

Expanse: 30-31 mm.

Type locality: near **Alpine, Brewster Co., Texas** (O. C. Poling).

Number and sexes of types: Holotype ♂, 15-30 May, 1926; allotype ♀, 8-14 May, 1926; 1 ♂ paratype, 8-14 July, 1926; 2 ♀ paratypes, 22-30 May, 1926.

ON THE IDENTITY OF *ASTHENA LUCATA* GN. (LEPID., GEOMETRIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN
Decatur, Illinois

This species was described by Guenée, 1857, Spec. Gén., IX, 437, based on a single female from Canada.

A female, figured by Oberthur (f. 3398), is in the Barnes collection. It bears labels "Canada," "ex Musæo Ach. Guenée," "Typicum Specimen." This specimen agrees well with the original description which is decidedly violated by the species heretofore placed as *lucata*. We think it is the type. It is in rather poor condition, without body or hind legs. We have seen no other examples like it. It belongs to the group with single accessory cell, twelve veins to the primary, unarmed fore tibiæ, m. d. c. vein of hind wing nearly erect, short palpi, and dark frons. It has much the markings and appearance of a pale *Hydrelia inornata*, but with the size of *Venusia cambrica*. Tentatively we leave the species in *Hydrelia*. The name *condensata* Wlk. becomes available for *lucata* Auct. nec Gn.

TEN NEW LEPIDOPTERA FROM MEXICO

BY HARRISON G. DYAR

*United States National Museum
Washington, D. C.*

HESPERIIDÆ

Oarisma era Dyar, n. sp.

Wings black above, the margins bright orange, cut by the veins; on fore wing the terminal third is invaded by the orange color, becoming faint at tornus; hind wing less broadly orange, disappearing below vein 2. Below the orange of fore wing is broader costally, shaded, only slightly cut by black veins; hind wing dark brown, the veins powdery white lines, the orange touching the margin and running deeply toward base along submedian fold. Expanse, 32 mm.

Three specimens, **Contepec, Michoacan, Mexico**, September and October, 1926 (R. Müller).

NOCTUIDÆ

Eripoyga lathen Dyar, n. sp.

Dark brown; fore wing dark brown with yellowish under tint; subbasal and inner lines black, narrow, wavy, obscurely doubled, slightly paler filled; outer line sharply crenulate on the veins, with a faint outer uncrenulate doubling line, slightly paler filled; claviform scarcely indicated; orbicular round, slightly paler filled; reniform similarly paler filled, but largely obscured by a median black shade-line, which is angled in the reniform at a minute white speck in its lower corner; subterminal line yellowish, powdery, a little flexuous, emphasized by little black cuneiform dashes, small below, more distinct but short opposite cell; termen somewhat darker shaded, pale terminal line and dark fringe. Hind wing dark brown without discal lightening; fringe contrastingly paler, yellowish, brown irrorate. Expanse, 30 mm.

Type, female, **Contepec, Michoacan, Mexico**, October, 1926 (R. Müller).

Hyssia stellipars Dyar, n. sp.

Dark gray; fore wing dark gray; subbasal half line and inner line black, double, coarsely crenulate; a narrow black line from base along submedian fold to location of obsolete claviform; orbicular and reniform large, black outlined, concolorous filled; orbicular somewhat oblique, reniform pale filled above, below with the median black shade which runs obliquely from costa, narrow below and parallel to the outer line; veins minutely white powdered, two white streaks beyond reniform at bases of veins 4 and 5; outer line narrow, black followed by a narrow pale area; terminal space rather darkly shaded, the subterminal line black irregularly dentate shaded; a black terminal line with pale points. Hind wing whitish over the

disk, veins and margin broadly dark gray; fringe whitish interlined with dark. Expanse, 24 mm. Male antennæ simple.

Type, male, **Contepec, Michoacan, Mexico, October, 1926** (R. Müller).

Pseudacontia tricircula Dyar, n. sp.

Wings narrow, elongate, rather squarely cut. Light gray; fore wing light gray, darker basally, costally and terminally, finely irrorate; inner line far from base, slender, black, straight across wing; claviform, orbicular and reniform rounded, neatly outlined in black, concolorous filled, claviform touching inner line, ovate; reniform with a dark central cloud; outer line slender, black, single, looped out beyond reniform which nearly touches it; veins indistinctly dark lined outwardly; subterminal line obsolete; a narrow black terminal line; fringe paler, spotted with gray. Hind wing white, with traces of a gray terminal line apically and faint submarginal dots on the veins. Expanse, 32 mm.

Type, male, **Contepec, Michoacan, Mexico, September, 1926** (R. Müller).

Structurally agreeing with *Pseudacontia*, but the entirely different wing shape may ultimately require another genus.

Agrotis miniptica Dyar, n. sp.

Fore wing warm gray; a little line of bright red along costal margin, inner margin and tip of fringe; subbasal half line slender, black, inwardly oblique; inner line blackish, single, dislocatedly angled on vein 1, very obsoletely doubled within; reniform and orbicular yellow margined, orbicular open above, reniform with a blackish cloud in lower segment; a median shade line, roundedly incurved in cell; outer line slender, denticulate on the veins, very obsoletely doubled outwardly; subterminal line shaded, dusky, tending to form cuneiform spots between the veins, with a few bright scales outwardly; a terminal dotted dark line. Hind wing translucent blackish, fringe pale. Expanse, 41 mm.

Type, female, **Contepec, Michoacan, Mexico, October, 1926** (R. Müller).

GEOMETRIDÆ

Sicya sistenda Dyar, n. sp.

Fore wing light yellow, the costa rather broadly pale pinkish, but the color is not contrasted; a small round dark brown discal dot; outer line only present, pale purplish, faint below vein 3, the upper part shaded and with small blackish points on the veins; fringe concolorous. Hind wing whitish, yellow shaded outwardly; a single small round discal point. Expanse, 31 mm.

Type, male, **Colima, Colima, Mexico, October, 1926** (R. Müller).

Eucymatoge obliquiplaga Dyar n. sp.

Fore wing light gray, reddish brown narrowly at base; a basal black dot; a subbasal narrow black angled line; centrally four lines cross the wing, the inner broadly shaded and oblique from before middle of inner margin to end of cell, where it is reflexed to costa; other lines roundedly excurved over cell to costa, the outer one more remote and showing dots on the veins above; costa apically black shaded; an indefinite subterminal line; a terminal black line with dots on the veins. Hind wing very pale gray, with six lines on the inner half, basal broad, second and third wavy, fourth broad, fifth and sixth wavy; a minute discal dot. Expanse, 18 mm.

Type, female, **Contepec, Michoacan, Mexico**, October, 1926 (R. Müller).

PYRALIDÆ

Desmia pantalis Dyar, n. sp.

Antennæ long; a slight bend at basal fourth, but without distinct tuft. Fore wing narrow, pointed, lustrous bronzy brown; two large white semihyaline spots, the inner crossing the wing, with a wavy black line just within its lower border below; outer spot from costa to vein 3, also with a denticulate black line outwardly, within its outer edge costally; fringe white, interlined with brown. Hind wing with the disk broadly white from costa to inner margin, narrowing sharply toward inner margin; a round black spot on origin of veins 3-5; a curved spot beyond it close to the black margin, this spot faintly continued toward costa; fringe as on fore wing. Expanse, 24 mm.

Type, male, **Colima, Colima, Mexico**, November, 1926 (R. Müller).

Nearest *ufcus* Cramer, but the outer line unusually detached and two black spots on hind wing.

Crambus rotarellus Dyar, n. sp.

Fore wing silvery white, shaded with blackish along base of costa and irrorated with this color over lower half of wing; a diffused yellowish brown line beyond middle, sharply angled at discal fold, else straight, with an intensification at discal fold; an outer double submarginal line, inner segment crenulate, outer shaded and broken; a narrow terminal black line, with little dashes at the ends of the veins. Hind wing white. Expanse, 15 mm.

Type, female, **Contepec, Michoacan, Mexico**, September, 1926 (R. Müller).

Near *pusionellus* Zeller, larger, the outer line crenulate and excurved only subcostally.

SYNTOMIDÆ

Leucotmemis pardalimacula Dyar, n. sp.

Antennæ black with a white patch on one side before tip. Head orange; thorax black, a broad orange stripe on each patagium and an anterior orange spot between. Abdomen blue-black with whitish reflection, segments bordered posteriorly with orange above and below. Wings hyaline, veins and outer border black; apex broadly black, truncating the hyaline area almost to margin at vein 3, broad again at tornus; orange markings bordering the hyaline area as follows: A line below vein 12 to end of hyaline area; a small spot in base of cell; a lunate discal spot; a spot below it in interspace 2-3; four spots at end of hyaline area between veins 3-4, 4-5, 5-6, and 6-7 respectively; two spots at end of hyaline area on either side of submedian fold; a long spot at base below submedian fold; a spot at base, and further out a long spot below vein 1. Hind wing small, black, with two hyaline areas, the basal edged with orange above and below, the outer with a little orange outwardly, cut by three black veins; costal edge orange to outer hyaline spot. Expanse, 37 mm.

Type, female, **Colima, Colima, Mexico**, October, 1926 (R. Müller).

ON THE IDENTITY OF CHÆRODES
INCURVATA GN.

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

This insect was described by Guenée, 1852, Sp. Gén., IX, 37, and figured in Atlas, pl. III, f. 2. The Barnes collection possesses a specimen bearing labels, "Bdv.," "Ex Musæo Ach. Guenée," "Typicum Specimen." This specimen exactly agrees with the original description. The transverse lines and black shades have obviously been accentuated by the artist who made the figure as the description states "—saupoudrées d'atomes noirs qui s'accumulent en une série peu marquée de taches subterminales, avec une ligne fine, peu visible, très-droite, marquée de points blancs sur les nervures—"

We are convinced that the specimen before us is the type. Other females from St. Petersburg, Florida, closely match it, and the name should be used for the Gulf Strip race of *Sabulodes transversata* Dru. with *transvertens* Wlk. as a color form, slightly paler but with more heavily marked t. p. lines.

The form heretofore going as *incurvata* was determined in the Guenée collection as *transversata*, which accounts for Guenée having renamed the typical *transversata*, *goniata*.

NEW SPECIES OF NORTH AMERICAN RHYNCHOPHORA (COLEOPTERA)

BY EDWIN C. VAN DYKE

*University of California, Berkeley, California**Pissodes robustus* Van Dyke, new species

Robust, reddish brown, pronotum with the usual two small patches of white scales, a few similar scales in front and more numerous ones along the sides, scutellum completely clothed with white scales, the elytra with rather large subbasal patches of light buff scales, obliquely placed from the third to seventh interval, and very large patches of white and buff scales at apex of elytral declivity, the latter broadly margined with black, the underside and legs more or less ornamented with white scales. Head coarsely, densely punctured in front, a deep fovea between eyes; beak shorter than prothorax, very broad and robust, coarsely, densely punctured at base, more finely apically. Prothorax slightly broader than long, almost as broad as elytra, very convex, hind angles obtuse and slightly rounded, sides broadly arcuate and gradually narrowed toward apex, the disk coarsely, closely punctured and with small carina at middle. Elytra twice as long as prothorax, third and fifth intervals considerably elevated, the seventh to a lesser degree, the fifth tuberculate posteriorly, the striæ very coarsely, not closely punctured. Length 6 mm. from base of beak to tip of elytra, beak 1.75 mm., breadth 2.5 mm.

Holotype (No. 2464, Mus. Calif. Acad. Sci.) and paratype in my collection, taken by Mr. A. H. Muzzall at Camp 20, Hammond Lumber Company, Humboldt County, California, June and July, 1916. The host tree was not identified.

This species has a color pattern very close to that of *Pissodes terminalis* Hopping,¹ but it differs greatly otherwise, for it has a more robust and shorter rostrum and the hind angles to prothorax obtuse and somewhat rounded, not sharply right angled. In Hopkins' Monograph of *Pissodes*,² it would fall in his key to the species very close to *similis* Hopk., but can be separated from the same by being larger with the rostrum and prothorax both more robust, the latter with hind angles obtuse and somewhat rounded, the elytra with alternate intervals more elevated and color pattern more conspicuous. From *Pissodes barberi* Hopk., which occurs in its territory, it differs definitely by being

¹ A New Species of the Genus *Pissodes* (Coleoptera), by Ralph Hopping, Can. Ent. Vol. LII (June, 1920), p. 133.

² Contribution toward a monograph of the bark weevils of the Genus *Pissodes*, by A. D. Hopkins, Tec. Ser. No. 20, pt. 1, U. S. D. A., November 11, 1911.

reddish brown, not black, with the anterior elytral color patch rather large, not indistinct, and the posterior very large, not small. *Pissodes costatus* Mann., which also simulates it, lacks the very robust rostrum and prothorax, the somewhat rounded hind angles to latter, the rather large anterior color patch, and in addition has the posterior spot anterior to the declivity.

Pissodes ochraceus Van Dyke, new species

Robust, reddish brown, pronotum with the usual two patches of white scales and in addition a few buff scales in front, elytra with a subbasal patch of ochre colored scales, of moderate size, and a large transverse patch of scales of the same color, surrounded by a black margin, anterior to the elytral declivity, and a few scattered white scales both above and beneath. Head moderately coarsely, densely punctured in front, a shallow fovea between the eyes; beak equal in length to prothorax, robust, coarsely, densely punctured at base, finer apically. Prothorax slightly broader than long, almost as broad as elytra, very convex, hind angles obtuse and blunt, sides broadly and evenly arcuate until near apex where suddenly constricted, disk coarsely, closely punctured and with fine carina at middle. Elytra twice as long as prothorax, third and fifth intervals distinctly elevated, the seventh to a lesser degree, the fifth tuberculate posteriorly, the striæ coarsely, not closely punctured. Length 6.5 mm. from base of beak to tip of elytra, beak 2 mm., breadth 2.5 mm.

Holotype (No. 2465, Mus. Calif. Acad. Sci.) and one paratype in my collection, taken by myself at **Meadow Valley, Plumas County, California**, June 6, 1924. The host tree could not be located.

The distinctive color pattern of this species readily separates it from all of our other species. Structurally, it somewhat resembles the preceding but has a slightly narrower and more cylindrical beak, less coarsely punctured, more suddenly narrowed prothorax in front, and the posterior elytral maculation anterior to the basal declivity. In this latter regard as well as by its general shape, it closely approaches *Pissodes costatus* Mann. and is no doubt somewhat related to it.

Anculopus Van Dyke, new genus

Moderately elongate and somewhat flattened; beak free, not flexed, moderately robust, somewhat shorter than prothorax, slightly curved, suddenly constricted at base and just behind eyes, the apical portion slightly wider than basal, antennæ inserted toward sides one-third from apex and with insertion visible from above, the scrobes deep, bent backward and beneath to inferior margin of eyes where

somewhat dilated, mandibles biemarginate and tridentate at tip; eyes not large but protuberant and slightly angulated at apex; antennæ with first segment of funicle longer than broad, the four following transverse and gradually broader, the terminal forming a compact fusiform club. Prothorax longer than broad, the prosternum slightly emarginate in front, the front coxæ narrowly separated by prosternal spine. First and second ventral segments each considerably longer than third and fourth united, the triangular suture separating them finely yet distinctly defined throughout. The femora moderately clavate, tibiæ rather long, curved near apex, with corbels and a long oblique claw at apex which is dilated and ciliated basally.

Genotype, *Anculopus foveatus* Van Dyke.

This genus undoubtedly belongs very near *Paraplinthus* and as such within the tribe Hylobiini as defined by LeConte and Horn.³ The more restricted tribe given by Blatchley and Leng⁴ would not receive it because of the distinct though narrow separation of the front coxæ though it possesses all of the other characters called for. I believe that the Pissodini should be kept distinct from the Hylobiini as has been done by the latter workers, but I also believe that the second tribe should be extended so as to admit this genus, for it without doubt belongs here. From *Paraplinthus* and other members of the tribe, it differs by the narrow separation of the front coxæ as well as by the peculiar stalk-like formation of the eyes, the latter character separating it from all weevils which might be confused with it.

Anculopus foveatus Van Dyke, new species

Somewhat elongate, slightly flattened above; black, the rostrum, antennæ and legs rufopiceous. Head with basal portion smooth and shining, rostrum coarsely, shallowly and sparsely punctured basally, more finely, distinctly and closely apically. Prothorax distinctly longer than broad, apex truncate above, base slightly arcuate, sides broadly arcuate, constricted in front, disk moderately convex, a narrow and smooth longitudinal carina at middle, elsewhere opaque and deeply pitted or foveate, the foveæ well spaced and with a minute golden scale at the bottom of each. Elytra almost twice as long as prothorax and distinctly wider, elongate elliptical, moderately convex, the striæ defined by a series of very large, deep foveæ, somewhat closely placed, the intervals narrow and sinuate in front, broader and elongate tuberculate at sides and rear, the general sur-

³ Classification of the Coleoptera of North America, by John L. LeConte and George H. Horn, Smithsonian Misc. Coll., No. 26 (1883), pp. 468-9.

⁴ Rhynchophora or Weevils of Northeastern America, by W. S. Blatchley and C. W. Leng, Indianapolis (1916), p. 139.

face opaque like prothorax and with small golden scales at the bottom of each fovea and sparsely grouped on the summits of the tubercles. Beneath dull and coarsely but more shallowly foveate than above, the last ventral segment and legs more finely and closely punctured, all punctures with golden scales as above. Femora unarmed. Length including beak, 6 mm.; breadth, 2 mm.

Holotype (No. 2466, Mus. Calif. Acad. Sci.), a unique in my collection, taken by myself at **Humptulips, Washington**, May 28, 1914.

This deeply pitted species superficially resembles the European *Epipolacus (Plinthus) caliginosus* (Fabr.) and some of the more robust Cossoninæ, but no weevil that we have in this country. It no doubt has habits somewhat similar to *Paraplinthus carinatus* (Mann.), for it was found in deep coniferous woods just as that is.

Acmægenius granicollis Van Dyke, new species

Robust, black, subopaque, sparsely clothed with rigid hair, moderately dense and suberect on elytra, and with a few scattered white scales. Head somewhat shining, coarsely, densely punctured; beak broad, deeply grooved above, with less defined lateral grooves, and scrobe deep and broad to lower margin of eyes; antennæ less compact than in *hylobinus* and with second funicular segment proportionally longer. Prothorax as long as broad, hardly narrower at apex than base, sides moderately arcuate, disk convex, densely punctured and with intervals elevated into shining granules or small irregular tubercles. Elytra oval, almost twice as wide as prothorax and about two and a half times as long, disk very convex, striæ coarsely, moderately closely punctured, intervals vaguely convex and rather densely, irregularly punctured. Beneath rather densely, moderately finely punctured and rugose. Length including beak, 10 mm.; breadth, 4.25 mm.

Holotype (No. 2469, Mus. Calif. Acad. Sci.), a unique in my collection from **Carbon County, Wyoming**.

This species superficially looks like some of the smaller, more rubbed specimens of the only other species of the genus, *hylobinus*, but it definitely differs by having a prothorax that is evidently granulate above, merely punctate in the other, as long as broad, whereas broader in the other, and with the apex hardly narrower than base in contrast to a much narrower apex in the other; with the scrobe almost touching the eye, while it does not in the other; and with the underside evidently rugose. In my series of fifteen specimens of *hylobinus* from southeastern Oregon and northeastern California, there is con-

siderable variation especially as regards the distinctness of punctation of the elytral intervals, but none of them approach the other species in regard to the characters mentioned as defining it.

Trichalophus brunneus Van Dyke, new species

Large and robust, black, upper surface clothed with small cupreous brown scale-like hair, interrupted here and there along the line of the striæ, and with a conspicuous patch of silvery scale-like hairs along the sides of prothorax, a rounded patch on the disk of each elytra one-fourth distance from the base and a double patch on the sides of the elytral declivity on what would correspond to the fifth and sixth intervals, also a few small patches defining the lateral striæ, the underside with the pro- and mesosternum densely covered with brownish white scales, the abdomen with a few similar scales at sides, elsewhere finely pilose. Head with deep groove on upper surface of rostrum, lateral grooves moderately deep and triangular and the scrobe deep as usual. Prothorax slightly broader than long, evidently transversely impressed near apex, sides slightly arcuate in front of middle, disk evenly convex, moderately coarsely, densely punctured and finely granulate, a fine longitudinal carina at middle with a small fovea in front. Elytra about three times as long as prothorax and not quite twice as wide, very convex, apical declivity abrupt, apices divergent and dentate, discal striæ vague, lateral faintly impressed. Beneath with outer hind margin of fourth ventral segment dentate as in *didymus* and *constrictus*. Length including rostrum, 13 mm.; breadth, 5.5 mm.

Holotype (No. 2470, Mus. Calif. Acad. Sci.), a unique in my collection, taken by myself in the Yakima Indian Forest Reserve, altitude 3000 feet, on the east slope of **Mount Adams, Washington, July 1, 1925.**

This large and handsome species with the four silvery elytral spots standing out more conspicuously than in any of the other species against the rich coppery brown background, should make it readily recognizable. In LeConte's table ⁵ it would come close to *constrictus* (Lec.).

In this connection I wish to state that my series of specimens seem to prove that *didymus* (Lec.) and *constrictus* (Lec.) are but phases of the same thing as was surmised by LeConte. Both are often found in the same territory. These two also possess along with *brunneus*, a very prominent tooth on the outer posterior margin of the fourth ventral segment, a character which is not present in the other species.

⁵ The Rhynchophora of America, North of Mexico, by John L. LeConte and George H. Horn, Proc. Am. Phil. Soc., XV (1876), p. 119.

TRICHALOPHUS FOVEIROSTRIS Chittenden⁶

This insect belongs, I believe, in the genus *Plinthodes* Lec. rather than in *Trichalophus*. I have had several specimens of it in my collection for many years. They were taken in the coniferous forests on the top of Mount Mitchell and the adjacent peaks of the Black Mountains of North Carolina, during June, by Mr. William Beutenmueller and myself.

This species is smaller and the females more robust than *tæniatus*. In addition it is brown in color, with a more general dispersal of scale-like hair, has a shorter rostrum with shorter and broader lateral grooves, more prominent eyes, more finely rugose pronotum, narrower and slightly convex elytral intervals which are also more finely rugulose, and the third and fourth ventral segments broader. In some ways it strongly suggests some of the species of *Trichalophus*, especially as regards its size, color and vestiture, but its generic characters are eminently those of *Plinthodes*.

Phlæophagus californicus Van Dyke, new species

Elongate, subparallel, smooth and shining, rufopiceous. Head with eyes evidently protuberant, rostrum slightly longer than one-half length of prothorax, robust, distinctly and sparsely punctured; antennæ with first segment of funicle evidently longer than broad, second to seventh closely united, transverse and gradually broader, the club elliptical. Prothorax slightly longer than broad, sides rather evenly arcuate, constricted near apex, disk rather deeply, coarsely punctured, the punctures separated by a distance equal to their own diameter, finer near anterior margin. Elytra twice as long as prothorax, barely wider, sides parallel for basal three-fourths, broadly rounded to apex, striæ deep, rather coarsely, closely punctured, intervals perceptibly convex and crenulate, with a single series of fine punctures, the two outer longer intervals more or less finely carinate, the outermost evanescent before apex, the sulci on either side, therefore, blending near apex. Beneath rather coarsely, sparsely punctured, finer and closer on three anal segments. Length including rostrum, 3.75 mm.; breadth, 1.25 mm.

Holotype (No. 2471, Mus. Calif. Acad. Sci.), and several designated paratypes from a series of twenty-eight specimens. My types were collected at Los Angeles, California, many years ago. Others are from Saticoy, Ventura County, and Santa Barbara, California. It breeds commonly in the decay-

⁶ Proc. Ent. Soc., Washington, XXVII (1925), p. 141.

ing branches of willow, alder, walnut, and similar trees in company with *Rhyncolus angularis* Lec.

This species is larger than any of the species listed from eastern North America except *Codiosoma* (*Phlæophagus*) *spadix* (Herbst.) and is readily separated from that by being elongate subparallel and not pilose. It is also separated from *Phlæophagus apionides* Horn and *variolatus* Dury by its larger size as well as sparser pronotal punctation. From *Phlæophagus minor* Horn which it was questionably determined as many years ago, it differs by being larger, with rostrum broader at base and not dilated apically, by having the eyes more prominent, prothorax less narrowed forward, and much coarser punctation, especially of pronotum.

Phlæophagus canadensis Van Dyke, new species

Similar in general appearance to *californicus* but a bit larger, more robust; the rostrum less dilated, eyes hardly projecting beyond side margins of head, first segment of funicle as broad as long, prothorax more robust and inclined to have sides somewhat parallel at middle, elytra more attenuated posteriorly and the two outer longer elytral intervals, eighth and ninth, carinate posteriorly, the outermost reaching the apex. Length including beak, 4 mm.; breadth, 1.5 mm.

Holotype (No. 2472, Mus. Calif. Acad. Sci.), and three paratypes collected by Mr. F. S. Carr at **Medicine Hat, Alberta, Canada**, from decaying cottonwood, *Populus*, June 20, 1926. I have also seen another specimen taken at Victoria, British Columbia, by Mr. G. A. Hardy.

ON THE IDENTITY OF ACIDALIA BALISTARIA GN. (LEPID., GEOMETRIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

This species was described by Guenée, 1857, Sp. Gén., IX, 453, from 3 ♂, 1 ♀, Collections Boisduval and Lefebvre. There is a female in the Barnes collection labeled "Typicum Specimen," "Ex Musæo Ach. Guenée." This agrees well with the original description and is the species going in collections as *rufescens* Hlst. The Guenée name has priority. *Acidalia balistaria* Auct. nec Gn. becomes *Euacidalia perirrorata* Pack.

A NEW SPECIES OF DIPLOCYSTA FROM THE
PHILIPPINES (HEMIP.-TINGITIDÆ)

BY CARL J. DRAKE

Ames, Iowa

Diplocysta opipara Drake, new species

Elongate, moderately broad, yellowish brown, with brown to dark fuscous markings. Head short; anterior spines very short, blunt; median and posterior spines not very long, contiguous with the surface of the head. Bucculæ long, narrow, closed in front. Rostral channel open behind, the rostrum reaching almost to the venter. Odoriferous canal long and prominent. Antennæ long, brownish; segment I much stouter and a little longer than II; III very long, two and one-half times the length of IV; IV long, clothed with moderately long hairs, black, except small basal portion.

Pronotum tricarinate; the lateral carinæ short. Paranota enormously developed, somewhat cone-shaped, strongly inflated, covering most of pronotum (median portion of collum and most of triangular portion exposed), divaricating toward their crests. Elytra very similar in general appearance and color markings to *D. nubila* Drake; costal area irregularly triseriate, the areolæ variable in size. Body beneath black. Legs brownish, the tips of tarsi fuscous. Length, 4.32 mm.; width, 1.68 mm.

The lighter, more cone-shaped and divaricating paranota distinguish *D. opipara* n. sp. from *D. nubila* Drake. *D. nimia* Drake differs in having a broader costal area and much more strongly inflated paranota. The costal area is uniseriate in *D. bilobota* Horvath.

Holotype (male) and *allotype* (female) Bagnio, **Luzon, Philippine Islands**, in Drake collection. Three paratypes, taken with type in California Academy of Science and Drake collection.

ON THE PLACEMENT OF "OGDOCONTA" CAR-
NEOLA SM. (LEPID., PHALÆNIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

HOMOANARTA CARNEOLA Sm.

1891, Smith, Trans. Am. Ent. Soc., XVIII, 110, *Telesilla*.

Professor M. Draudt has called our attention to the fact that this species, usually placed in *Ogdoconta*, has strongly lashed eyes and belongs in the genus *Homoanarta* of the *Cuculliinae*.

KEY TO THE SUBTRIBE HELOCHARÆ ORCHYM.
(COLEOPTERA—HYDROPHILIDÆ) OF
BOREAL AMERICA

BY FRED C. WINTERS
Santa Barbara, California

- All tarsi five-jointed..... 2
 Middle and hind tarsi four-jointed..... 4
 2. Pseudo-basal joint of maxillary palpus curved, with the convexity to the front; mesosternum with a longitudinal lamina; elytra confusedly punctate.....*Enochrus*
 —. Pseudo-basal joint of maxillary palpus curved, with the convexity posteriorly; mesosternum at the most feebly protuberant 3
 3. Labrum visible*Helochares*
 —. Labrum concealed beneath clypeus, clypeus projecting laterally in front of the eyes to a great extent.....*Helobata*
 4. Mesosternal carina transverse or elevated at middle, forming a pyramidal or dentiform protuberance; maxillary palpi not longer than in *Enochrus*; tarsal claws simple.....*Cymbiodyta*
 —. Mesosternum with a compressed conical process; maxillary palpi long and slender; claws broadly toothed at base in male*Helocombus*

Genus ENOCHRUS (Thoms.) Zaitz.

- Last two joints of maxillary palpi nearly equal in length.....
Subgen. *Enochrus* s. str.
 Last joint of maxillary palpi always shorter than the preceding..... 2
 2. Series of coarser punctures on head and thorax indistinct or very much reduced.....Subgen. *Methydrus* Rey
 Series of coarser punctures distinct.....Subgen. *Lumetus* Zaitz.

Subgenus ENOCHRUS Thoms.

- Prosternum not carinate, piceous; sides of head and prothorax pale*cuspidatus* (Lec.)
 Prosternum carinate 2
 2. Piceous; head entirely, tips of last joint of maxillary palpi piceous; front angles of prothorax narrowly testaceous.....*carinatus* (Lec.)
 —. Prothorax and elytra rufo-testaceous, head piceous.....*fucatus* (Horn)

Subgenus METHYDRUS Rey

Three species belonging to this subgenus have been described from our fauna. They are undoubtedly closely related to each other, and further studies may prove them mere variations. The mesosternal carina is feebly prominent, never laminiform.

Larger size, 3-4 mm. *ochraceus* (Melsh.)
 Smaller size, 2.5-3 mm. *curialis* Knisch., *sublongus* (Fall)

E. ochraceus (Melsh.). Common in the New England States, rare in California. I have seen specimens from Kissena Lake, L. I.; Hackensack Meadows and Lakehurst, N. J.; Flatbush, Flushing, L. I. (Coll. Dow); Montgomery City, Md. (Coll. Shoemaker); Westport, Freetown and Stoneham, Mass. (Coll. Dodge); Riverside, Cal., June, in my collection; Richmond, Va., the specimens from this last locality being of smaller size, about 3 mm.

E. curialis Knisch was described in the Entomol. Anz., Jahr. IV, No. 5, from three examples of the stockholm Museum's collection from Carolina.

E. sublongus Fall, Bul. Brooklyn Ent. Soc., XXI (1926), p. 125, described as *Philhydrus elongatulus* Fall (new spec. of N. A. Hydrobiini) Jour. N. Y. Ent. Soc., XXXII (1924), p. 85, from specimens taken at St. Petersburg and Tarpon Springs, Fla., in which special reference was made to the extremely minute emargination of the last ventral segment.

Subgenus LUMETUS Zaitz.

Professor Fall called attention to the fact that a number of species in this group have a small emargination at the apex of the last ventral segment, a character I shall make use of in the following table:

Last ventral segment emarginate at apex.....	2
Last ventral segment not emarginate	7
2. Prosternum carinate	3
— Prosternum not carinate.....	4
3. Prothorax with a large discal piceous space.....	<i>nigrellus</i> (Sharp)
— Prothorax entirely testaceous	<i>nebulosus</i> (Say) and var. <i>pectoralis</i> (Lec.)
4. Anterior claws of male not distinctly toothed although with a basal angulation	5
— Anterior claws of male distinctly toothed.....	6
5. Basal marginal line of prothorax distinct, maxillary palpi more or less piceo-testaceous, western.....	<i>californicus</i> (Horn)
— Basal marginal line indistinct, maxillary palpi testaceous, large species, eastern	<i>cinctus</i> (Say)
6. Large species, length 7-8 mm., maxillary palpi piceous.....	<i>consors</i> (Lec.)
— Smaller, 3.5-4 mm.	<i>blatchleyi</i> Fall

7. At least one claw on each tarsus of male toothed..... 8
 —. Anterior claws of male not toothed, species piceous.....
 *perplexus* (Lec.)
 8. Species piceous *conjunctus* (Fall)
 —. Entire upper surface testaceous..... *reflexipennis* (Zimm.)
 —. Prothorax with a large discal piceous space, broader species
 *hamiltoni* (Horn)
 —. Prothorax testaceous, head more or less piceous, narrower
 species *diffusus* (Lec.)

E. nigrellus (Sharp), Biol. Centr. Amer. Coleop., I (2), 1882, p. 68 (*Philhydrus*).

This is an addition to our list. Elliptical, convex, shining, brown to piceo-testaceous, head piceous with a paler space in front of each eye. Prothorax with a large piceous median space, sometimes shading gradually into the paler color of the sides, distinctly and moderately closely punctate, the arcuate and transverse series of coarser punctures and basal marginal line distinct. Elytra punctured similarly to the thorax, with the punctures less impressed toward the apex, the usual series of coarser punctures distinct. Body beneath piceous, opaque, prosternum strongly carinate, the carina more elevated in front, mesosternal lamina very prominent with an acute angle, femora piceous, tibiæ and tarsi rufo-testaceous, tarsal claws as in *ochraceus*, last ventral segment emarginate at middle. Length, 3.5-4 mm.

This species closely resembles *ochraceus* in shape and color, but is easily recognized by its carinate prosternum and strongly laminate mesosternal protuberance. From *nebulosus* it is separated by its color and the piceous space at middle of pronotum. My description is based on a series of twelve specimens from Riverside and Santa Barbara, California.

E. nebulosus (Say) occurs from Canada to Florida and westward to Indiana and California. I have seen specimens from Claremont, N. H. (Coll. Dow); Pinehaven and Rockaway Beach, L. I. (Coll. Shoemaker); Ithaca, N. Y. (Coll. Richmond); Nashville, Tenn. (Coll. Dodge); Paradise Key, Fla. (Schwarz and Barber); Tompkins Cove, N. Y.; Jekyll Island, Ga.; Porto Rico (Amer. Mus. Nat. Hist., N. Y.); and Richmond, Va.

The variety *pectoralis* (Lec.) is confined to southern California and is distinguished by the minute punctuation of the upper surface, and averages smaller in size and is less convex in form than typical *nebulosus*. It occurs in brooks, my specimens being from Ventura and Riverside, California.

E. californicus (Horn). This species resembles in form and color, *Cymbiodyta dorsalis* (Mots.), but is easily separated from that species by its generic characters. Specimens when not fully mature are brownish testaceous, but change to piceo-testaceous upon reaching maturity. The second maxillary palpus at basal half, and terminal joint at tip are darker, the coarser arcuate series of punctures on prothorax and basal marginal line are distinct, the coarser punctures of elytra indistinct, and the last ventral segment emarginate. This species seems to prefer standing water. My specimens are from Santa Barbara and Riverside, California.

E. cinctus (Say). This large piceous species could only be compared with *E. consors* (Lec.), but its testaceous maxillary palpi, indistinct basal marginal line and untoothed male claws will easily separate it. It prefers standing water and occurs, according to Doctor Horn, from Canada and the New England States south to Georgia and west to Kansas. Blatchley records it as throughout Indiana, and Leng and Mutchler, from Lake Worth and Lake Okeechobee, Fla. I have seen specimens from New Haven, Conn.; Lakehurst and Hackensack Meadows, N. J.; Flatbush, Rockaway Beach and Kissenor Lake, L. I.; Stoneham, Mass.; Chicago, Ill.; and the Catskill Mountains, N. Y.

E. consors (Lec.). The piceous maxillary palpi will separate this from the other members of its genus. I have seen specimens from Brookville and Lakehurst, N. J.; Pablo Beach, Fla. (Coll. Dodge); Writesville, N. C. (Coll. Davis); and Paradise Key, Fla. (Barber and Schwarz).

E. blatchleyi (Fall) is piceous black, formed nearly as in *nebulosus*, thorax somewhat paler, ventral apex with a minute emargination, protarsal claws of male each with a moderately strong, nearly rectangular basal tooth, and the prosternum not carinate. I have seen no specimens. Professor Fall records it from Dunedin, Tarpon Springs, and St. Petersburg, Fla.

E. perplexus (Lec.). This may easily be recognized by its piceous color, elongate form and non-emarginate last ventral segment. It is common from Canada to Florida. My specimens are from Hackensack Meadows, N. J.; Kissenor Lake, L. I.; Ottawa, Ont. (Coll. Beaulne); Writesville, N. C. (Coll. Davis), and Stone Mountain, Ga. (Cornell University).

E. conjunctus (Fall). According to Professor Fall, this species much resembles *E. carinatus* (Lec.) in color but is much smaller and less convex and, by the palpal characters, belongs to a different section of the genus. The claws are toothed somewhat after the manner of *E. hamiltoni* (Horn). It was described as from Lake Tahoe, California.

E. reflexipennis (Zimm.). This species may easily be recognized by its pale head and testaceous surface. It is a saltwater species found on the coast of Connecticut and Long Island. I have seen specimens from Norwalk and the saltwater marshes near New Haven, Conn., North Beach and the marshes of Rockaway Beach, L. I. (Coll. Shoemaker), and Staten Island.

E. hamiltoni (Horn). This species is as a rule more broadly oval than the following and the thorax has a large piceous space at middle. It is common in salt as well as fresh-water marshes and is recorded from Canada to Florida and westward to California. I have seen specimens from Rockaway Beach, L. I.; Staten Island; Yonkers, N. Y.; Chesapeake Beach, Md.; Tiverton, R. I.; Stoneham, Mass.; Orono, Me.; Chicago, Ill.; Wathena, Kan. (Coll. Dodge); Cornwall, Conn. (Coll. Chamberlin); and Paradise Key, Fla. (Schwarz and Barber). Professor Blatchley records it as frequent in Lake, Starke, and Luparte counties, Indiana.

E. diffusus (Lec.). This species while closely resembling *hamiltoni* is much more oblong in shape and has no thoracic piceous space, and the anterior claws of the male are more everted. Doctor Horn records it from Illinois, Dakota, Wyoming, Nebraska, and California. My specimens are from Santa Barbara, California, caught in marsh land along the seashore. It seems to be rare in collections and I have seen none from the Atlantic coastal regions.

GENUS HELOCHARES Muls.

This genus differs from *Enochrus* by its maxillary palpi which are shaped like those of *Cymbiodyta*, from *Cymbiodyta* by its five-jointed middle and hind tarsi and slightly emarginate last ventral segment, and from both by having the clypeus more broadly rounded in front and the apex deeply emarginate, exposing the labrum to a larger extent. This is the only genus in the Hydrophilidæ, so far as known, where the female attaches its egg cases to the abdomen until the larvæ are hatched.

Two subgenera occur in our fauna, which may be separated as follows:

- Elytra non-striate, sutural striæ absent, maxillary palpi very slender
Subgen. *Helochares* s. str. Muls. (Kuw.)
- Elytra with ten well-marked striæ, last joint of maxillary palpi at the most as long, and as a rule shorter than, the penultimate
Subgen. *Hydrobaticus* W. McLeay

Subgenus HELOCHARES, s. str. Muls. (Kuw.)

H. sellæ Sharp. Broadly oblong, feebly convex; black above, shining, sides of clypeus in front of eyes, labrum, the side margins of prothorax and elytra reddish piceous; under surface dark piceous, antennæ, palpi and tarsi paler. Head distinctly punctate; clypeus emarginate with an irregular transverse series of larger punctures on either side near the front, clypeal suture marked by larger punctures; maxillary palpi very slender, piceo-testaceous, pseudobasal segment curved with the convexity posteriorly. Prothorax distinctly punctate, transverse series of coarser punctures very prominent, basal marginal line absent. Elytra distinctly punctate, punctures toward apex less deep with a distinct series of coarser punctures along the middle, and two others less distinct external to these; sutural striæ absent. Length, 5.5 mm.

This species was collected by Professor Blatchley at Dunedin, Florida, and described as *Philhydrus estriatus* Blatch. He had the kindness to send me a cotype, which I found to be *H. sellæ* Sharp, originally described by Doctor Sharp from Cordova, Mexico.

Subgenus HYDROBATICUS W. McLeay

The two species known from our fauna are separated as follows:

- Mentum slightly emarginate at apex, arcuate series of coarser punctures on prothorax absent, eastern.....*maculicollis* Muls.
- Mentum deeply emarginate, arcuate series of prothoracic punctures distinct*normatus* (Lec.)

H. maculicollis Muls. My specimens are from Richmond, Va. Doctor Horn records it from Ohio to North Carolina, Florida, and Texas; Professor Blatchley from Dunedin, Fla.; Leng and Mutchler from Eson River, Fla.; and Uhler from Washington, D. C.

H. normatus (Lec.) has, as Doctor Horn rightly observed, the mentum emarginate and the mesosternum feebly carinate

and similar to *Enochrus ochraceus* (Melsh.). The subgenus *Chasmogenus* Sharp is founded on a species that is non-striate, except for the sutural striæ, with very long maxillary palpi, as long as head and pronotum together, with mentum deeply emarginate, and mesosternum carinate. The ten-striate elytra and comparatively short maxillary palpi place this species in *Hydrobaticus*, a view which has been taken by both Orchymont and Knisch. It occurs in the slowly flowing waters of southern California and seems not to object to warm springs. My specimens are from Ventura, Santa Barbara, Riverside, and Arrowhead Hot Springs, California. Doctor Horn records it from San Francisco southward into the Peninsula of California and eastward to Arizona.

Genus HELOBATA Bergr.

This genus is peculiar in having the labrum concealed under the clypeus; mentum transversely quadrate, its triangularly, apparently elevated, area at center slightly concave and with a small circular emargination in front, obliquely impressed on each side where it joins the submentum; maxillary palpi very long and in the specimens before me with a tendency to fold between the elevated triangular center and submentum; clypeus projecting laterally in front of the eyes to a great extent; prothorax and elytra broadly margined, the latter extending beyond the tip of the abdomen. According to Doctor Sharp, the anterior coxal cavities are closed behind by the junction of the epimera with the prosternal process, a character which isolates this genus from all other Hydrobiini although in other respects it is approached by various species of *Helochares*.

H. striata Brullé. This species has been known to us heretofore as *Helopeltis larvalis* Horn. I have two specimens before me from Florida which present the following characters: slightly piceous or somewhat testaceous in color; head and prothorax obsoletely rugulose, smoother at sides; apex of prothorax emarginate, arcuate series of coarser punctures absent; scutellum elongate triangular, scutellar striæ distinct; elytra obsoletely rugulose, explanate at sides, with ten punctate striæ, the last two close together, leaving a narrow interval between; the side margins wide, explanate; prosternum and mesosternum simple; last ventral segment emarginate at apex, the femora pubescent and tibiæ finely spinulose.

Doctor Horn records it from Louisiana and Sonora; Doctor Sharp from Guatemala, Paso Antonia, 4000 feet, and Cuba; Leng and Mutchler, Florida (Roberts' Coll.); Blatchley, Sarasata, Florida, March 4, beneath chunks of débris half buried in the mud of tide-water marsh; and Knisch, southern part of North America, West Indies, Central and South America.

Genus CYMBIODYTA Bedel

Elytra with distinct striæ.....	2
Elytra without striæ (except the sutural).....	6
2. All striæ entire, scutellar row of punctures distinct.....	
..... <i>punctatostrata</i> (Horn)	
— Inner striæ much abbreviated.....	3
3. Mesosternal ridge broadly conical, when viewed posteriorly	
..... <i>fraterculus</i> Sharp	
— Mesosternal ridge straight or arcuate.....	4
4. Apex of clypeus straight, second segment of maxillary palpi and tips of terminal segment darker, arcuate row of coarser punctures of prothorax well marked, elytra ochraceous, striæ feebly impressed with punctures less coarse than in the following	<i>imbellis</i> (Lec.)
— Apex of clypeus arcuate-emarginate, maxillary palpi testaceous, arcuate series of prothorax reduced to a few coarser punctures, elytra piceous, border indefinitely paler.....	5
5. Larger, 5-6 mm., coarser punctures of alternate intervals distinct	<i>morata</i> Horn
— Smaller, 4-5 mm., coarser punctures of alternate intervals indistinct	<i>dorsalis</i> (Mots.)
6. Mesosternal ridge angularly elevated at middle or dentiform....	7
— Mesosternal ridge straight	8
7. Broadly oval, mesosternal ridge pyramidal, large species, 6-7 mm.	<i>rotunda</i> (Say)
— Oblong oval, mesosternal ridge dentiform, smaller species	<i>minima</i> Not., <i>acuminata</i> Fall
8. Clypeus with a brown spot in front of each eye, pale margin of prothorax and elytra pronounced.....	<i>blanchardi</i> Horn
— Clypeus piceous	9
9. Coarser series of punctures of elytra absent.....	<i>lacustris</i> (Lec.)
— Coarser series of punctures of elytra distinct.....	10
10. Elytra widest at basal third, then conspicuously narrowed toward apex, giving the species when viewed from above an egg-shaped outline.....	<i>imbriata</i> (Melsh.)
— Form depressed, oblong, elytra widest at middle....	<i>vindicata</i> Fall

C. punctatostrata (Horn). This species has the clypeus strongly arcuate-emarginate at apex, sides of clypeus slightly explanate and paler in front of each eye, striæ entire, in these

characteristics resembling *Hydrobaticus*, but the number of tarsal segments on the middle and hind tarsi will easily separate it from that subgenus. It is not rare in the mountain streams of the Coast Range of southern California. My specimens are from Camp Meeker, northern California, and Santa Barbara.

C. fraterculus Sharp. I have no specimens of this before me. Doctor Horn records it from southern Arizona well into Mexico.

C. imbellis (Lec.). This species is as a rule recognized by its brownish elytra, though in some cases its color approaches that of *dorsalis*. Its clypeus is narrowed toward apex in a slight curve with its front straight; its maxillary palpi are longer than in *punctatostriata* or *dorsalis*, with the second segment at base and terminal at apex darker. The arcuate series of coarser punctures of prothorax are very pronounced and the elytral striæ consist of much finer and only slightly impressed punctures as compared with *dorsalis*. Doctor Horn gives the number of entire striæ as five, but they are by no means constant. In my specimens from Camp Meeker five striæ are plainly discernible while in those from Santa Barbara they are reduced to two.

C. morata Horn and *dorsalis* resemble each other very closely. In both the clypeus is almost semicircular and slightly arcuate-emarginate in front, the prothoracic punctures of systematic value are very much reduced, and the maxillary palpi are shorter comparatively than in *imbellis*. I have found that the only way of separating *morata* from *dorsalis* is by its average larger size and the greater prominence of the coarse interstitial punctures. I have studied thirty specimens from Jemez Springs, Ariz. (Coll. Sherman), and three specimens from Yuma County, Ariz., June (Coll. Dow).

C. dorsalis (Mots.) seems to prefer mountain streams at lower altitudes and is common in southern California. My specimens are from Camp Meeker, Santa Barbara, Santa Cruz Island, Ojai, and Riverside.

C. rotunda (Say). This species is the most broadly oval of any in this genus. Of its maxillary palpi I can unfortunately say nothing, as they are both missing in the two specimens before me. The mesosternum has the transverse ridge broadly pyramidally elevated, and one of my specimens, a male, has the

last ventral segment slightly emarginate at the middle of the apex, which is unique in this genus. It seems, while widely distributed, to be extremely rare in collections. My specimens are from Westwood, N. J., and Pennsylvania (collection by Henry Ulke in 1890). Doctor Horn records it from the Middle States as far south as North Carolina.

C. minima Not., Bul. Brooklyn Ent. Soc., XIV, 1919, p. 133. It was described from three specimens collected at Mooers, Clinton Co., N. Y., September, 1918. I have seen no specimens, but according to the description it is recognized by its small narrow form, 2.75-3.5 mm.; transverse row of coarser punctures of prothorax and rows of coarser punctures of elytra indistinct; nonstriate except for sutural striæ, with the mesosternal ridge strongly and acutely elevated at middle.

C. acuminata Fall, Journ. N. Y. Ent. Soc., XXXII, June, 1924. According to Professor Fall this species resembles in its general aspect smaller specimens of *C. vindicata* Fall or *Enochrus perplexus* (Lec.), with the pale margin of the prothorax extending narrowly across apex and vaguely inward for a short distance along base. The mesosternal transverse ridge is elevated into a long subconical acute spur.

C. blanchardi Horn. This species is easily recognized by its small broad form and pale space in front of each eye. It seems to prefer swift-running water. My specimens are from Ardsley on Hudson, N. Y., Halden, N. J., and Richmond, Va. Others seen were from Woodland, N. J. (Coll. Dow), Fairfax County, Va. (Coll. Shoemaker), Yonkers, N. Y. (Coll. Angel), and Cornwall, Conn. (Chamberlin).

C. fimbriata (Melsh.). We have to thank Professor Fall for the proper identification of this species which has long been confused with *vindicata* Fall or Zimmerman's *semistriatus*. *Fimbriata* is more convex, with elytra distinctly narrowed posteriorly almost from the basal fourth, and is much rarer than *vindicata*. My specimens are from Van Cortland Park, N. Y., and Westwood, N. J. Professor Fall records it from New Hampshire and Massachusetts.

C. vindicata Fall. This species is common from Canada to Texas. I have seen specimens from Kissenor Lake, L. I., Staten Island and Tompkins Cove, N. Y.; Secaucus, N. J.; Woodstock, Vt.; Monticello (U. S. N. M.); Tatowa, N. J.;

Claremont, N. H. (Coll. Dow); Ithaca (Coll. Richmond); Orono, Me. (Coll. Dodge); Cornwall, Conn. (Coll. Chamberlin); and Richmond, Va. This species has heretofore been known as *C. fimbriata* (Melsh.).

C. lacustris (Lec.). This species is of an oblong form, with coarser punctures of elytra absent and the transverse ridge of mesosternum short. It is not rare, occurring from Lake Superior to New England. My specimens are from Kissenor Lake, L. I., Hackensack Meadows, N. J., Cornwall, Conn. (Coll. Chamberlin), New Haven, Conn., Flatbush, L. I. (Coll. Shoemaker), and Framingham, Mass. (Coll. Dodge).

Genus HELOCOMBUS Horn

Tarsi heteromerous, maxillary palpi very long, curved as in *Cymbiodyta*, prothorax without basal marginal line, elytra deeply striate, resembling in form and structure *Hydrobius fuscipes* L., but easily separated from it, aside from its more important structural characters, by its long maxillary palpi.

H. bifidus (Lec.). Doctor Horn records it from Canada and the Lake Superior region and the New England States southward to Georgia. I have seen specimens from Forest Park, L. I., in a pool among leaf mold, Weehawken, N. J. (Amer. Mus. Nat. Hist., N. Y.), Fall River, Mass. (Coll. Dodge), Ottawa (Coll. Beaulne), and Staten Island, N. Y. (Coll. Davis). Professor Blatchley records it as frequent in the lakes of the northern half of Indiana.

NOTE ON WESTERN BULB FLIES

In the past the syrphid fly *Eumerus strigatus* Fall. has been designated as the lesser bulb fly or onion fly, but it now appears that there are at least three species of *Eumerus* in the western states, two of which are quite common. The bulb flies are of considerable economic importance, and a careful study of several thousand specimens reared from infected bulbs in Washington, Oregon, and California should yield some interesting results. The commonest species in California is *Eumerus tuberculatus* Rond. Experimental work with these flies is being carried on at the United States Bureau of Entomology Field Station at Santa Cruz.—F. R. Cole.

FOUR NEW CALIFORNIA THYSANOPTERA WITH
NOTES ON TWO OTHER SPECIES

BY DUDLEY MOULTON

Family THRIPIDÆ Uzel

Subfamily THRIPINÆ Karny

Toxonothrips Moulton, new genus

(Toxon = bow)

Head broadly rounded in front, without prominent spines. Ocelli fully developed in female, absent in male. Antenna seven-segmented. Maxillary palpus three-segmented. Prothorax with two long spines on each posterior angle, without spines on anterior angles. Wings fully developed in female, bowed backward in the middle, scythe-shaped, with two longitudinal veins. Wings wanting in male.

I am designating *T. gramineæ* Moulton as the type of the genus.

Toxonothrips gramineæ Moulton, new species

Female, holotype. Color dark brown, abdominal segments two to five lighter, shading gradually to dark brown at tip. Antennal segments one and two dark brown, concolorous with head, three and four light yellowish brown, three a little lighter than four, five lighter at base, outer half of five, also six and seven dark brown. All femora dark brown, middle and hind femora lighter at extreme base. Fore tibiæ yellowish, shaded brown on upper and lower margins, middle and hind tibiæ brown shading lighter at outer ends. All tarsi light yellowish brown. Wings brown with basal one-fifth whitish. Crescents of ocelli deep orange-red.

Measurements: Total body length 1.50 mm. Head, length .175 mm., width .18 mm.; prothorax, length .13 mm., width .225 mm.; mesothorax, width .30 mm.; greatest width of abdomen .33 mm. Length (width) of antennal segments, I, 24 (27) microns; II, 33 (27); III, 48 (21); IV, 51 (18); V, 45 (18); VI, 60 (18); VII, 24; total length 270 microns.

Front of head including compound eyes broadly rounded, almost semicircular. Cheeks arched. All head spines short and inconspicuous. Eyes relatively small, together occupying about .4 the width of the head. Ocelli small but well developed. Mouth cone triangular with blunted tip, reaching about three-fourths across prosternum. Maxillary palpus three-segmented. Antenna seven-segmented, about one and one-half times as long as head. Forked trichomes on segments three and four, simple on segments five and six.

Prothorax with two prominent spines on each posterior angle (45-54 m. long), all other spines inconspicuous; three pair along posterior margin small. All legs slender, tibiæ and tarsi unarmed. Wings fully developed, reaching almost to tip of abdomen, with

anterior margin bowed backward in the middle and posterior margin parallel with anterior margin in median three-fifths of wing; costa with twenty-two spines, fore vein with six (3-2-1) in basal half and three in distal portion, hind vein with ten.

Abdomen broadly ovate with three terminal segments subtriangular. Segment eight with a fully developed but rather sparse comb. Two long strong bristles on each posterior angle of segment nine (inner 120 m., outer 150 m.), a median pair in front of posterior margin (111 m.), a short dorsal median lateral pair (48 m.). Segment ten with dorsal suture over entire length, longest spines weaker than those on segment nine, about 90 m.

Male, allotype. Color about as in female. Total body length .88 mm. Head, length .133 mm., width .133 mm.; prothorax, length .108 mm., width .15 mm.; pterothorax width .166 mm.; greatest width of abdomen .25 mm. Length of antennal segments, I, 24 microns; II, 33; III, 42; IV, 36; V, 33; VI, 48; VII, 18; total length 240 microns. Outer spines on posterior angles of prothorax 24 m.

Apex of head flattened, otherwise shaped as in the female. Spines inconspicuous. Ocelli entirely wanting. Wings wanting. Impressions on ventral side of segments three and four small, oval, not visible on other sternites. Posterior margin of the eighth tergite curved inward and forward from each side to near middle where both sides suddenly turn back to form a prominent median lobe, which reaches almost to posterior margin of ninth segment. Ninth segment with a pair of spines along posterior margin near outer angles (69 m. long), and a second pair of about equal length in the middle of the side margin. Segment ten with a single pair of curved spines 60 m. long.

Described from two females and one male taken from grass sweepings at **Lake Tahoe, California**, in July, 1926, by the writer (Reg. No. 956). All types in author's collection.

This species has the general appearance of a *Limothrips* Hal., but with head broadly rounded in front, without thorns on the ninth tergite and with seven-segmented antenna. If the maxillary palpi were two instead of three segmented, it would more nearly resemble *Baliothrips* Uzel. It differs from *Thrips* Linn., in the broadly rounded apex of the head, the absence of prominent head spines, and differently shaped wings in the female.

***Heliothrips bromi* Moulton, new species**

Female, holotype. With the characters of the genus. Color dark brown with yellowish connecting tissue between segments. Antennal segments one, two, six, seven, and eight dark brown; three and four light yellowish at either end, brown in the middle; five yellowish in basal half, dark brown in outer half. Legs yellow with all femora

and tibiae shaded light brown to brown in the middle. Wings transparent with only a slight shading of brown at extreme tip of fore pair.

Measurements: Total body length 1.23 mm. Head, length .133 mm., width .15 mm.; prothorax, length .12 mm., width .175 mm.; mesothorax, width .225 mm.; greatest width of abdomen .28 mm. Length (width) of antennal segments, I, 15 (24) microns; II, 36 (30); III, 45 (24); IV, 45 (24); V, 36 (21); VI, 27 (18); VII, 15; VIII, 30; total length 246 microns.

Male, allotype. Color as in female. Total body length 1.05 mm. Head, length .102 mm., width .133 mm.; prothorax, length .10 mm., width .18 mm.; pterothorax, width .20 mm. Impressions on sternites three to seven transversely elongate and narrow, and slightly bowed backward in the middle. Two pairs of short stout spines on the dorsal side of segment nine.

Described from twenty-seven female and four male specimens taken by the writer in the Mariposa Big Tree Forest, **Mariposa County, California**, in August, 1926. Host: *Bromus carinatus*, growing under giant redwoods. All types in author's collection (Reg. No. 968).

This species may be distinguished from *hæmorrhoidalis* Bouche by its more slender body, transparent wings except at the extreme tip, and the brown shading in the middle of all femora and tibiae, and from *fasciatus* Linn. by the absence of cross bands on the wings, and by the predominating color of the legs being light yellow shaded with light brown as compared with the dark brown in *fasciatus*.

***Heliothrips gossypii* Moulton, new species**

Female, holotype. Color yellowish brown with darker brown shadings giving a mottled effect. Legs yellowish to brownish white with all femora and tibiae shaded brown in the middle. Antennal segments one and two brown, three and four yellowish brown in the middle and yellowish white at the ends, five yellowish white at the base shading gradually to dark brown, six, seven, and eight dark brown. Wings grayish to yellowish white with three narrow brownish cross-bands in addition to a shading of light brown at extreme base. The first brown band at fork of veins is most conspicuous with more or less brownish gray shading between this and the second band at two-thirds the wing's length. The third band is represented by the darkened tip; hind wings transparent with a darkened median vein. Crescents of ocelli bright reddish orange.

Measurements: Total body length .83 mm. (in normal condition). Head, length .105 mm., width .150 mm.; prothorax, length .084 mm.,

width .17 mm.; pterothorax, width .24 mm.; wing, length .75 mm., width at middle .045 mm. Length of antennal segments, I, 15 microns; II, 36; III, 48; IV, 42; V, 42; VI, 27; VII, 15; VIII, 30; total length 255 microns.

Head 1.5 times as wide as long and .2 longer than prothorax; dorsal surface distinctly reticulate only along posterior margin, without conspicuous spines. Eyes prominent, not protruding, occupying slightly more than half the length of the head, with large facets, pilose. Ocello approximate. Antennæ twice as long as head, typical of the genus in shape.

Prothorax with indistinct reticulations, without prominent spines except a pair of rather short transparent ones on each posterior angle. Wings fully developed, seventeen times as long as width at middle, fore vein fused with costa beyond fork; costa with nineteen to twenty prominent spines and without fringe; principle vein with two spines near base and two near fork. The first three are transparent and inconspicuous, the fourth is at the fork and dark brown. One spine at fusion of anterior vein with costa and two on inner side of costa near tip, the distal one being within the darkened band and dark brown. Posterior vein with four spines, the first and third are within the white areas, and are transparent, the second is within the median brown band and is dark brown, the fourth is within the outer white area but dark brown (female paratype with six spines on posterior vein).

Abdomen broadly ovate, pointed at tip, segments one to eight striate laterally and with a comb arrangement of spines along posterior margins at sides. Four long spines on posterior margin of segment nine, the inner pair 54 m. long, the outer ones 78 m. Segment ten without dorsal suture, terminal spines short and weak.

Male, allotype. Color as in the female, except that the darkened wing bands are less pronounced and there is more brownish shading in the lighter areas. Light impressions on ventral side of segments three to seven long and narrow, extending almost entirely across sternal plates. Segment nine with one pair of short stout dorsal spines near median line and two pair of longer spines near posterior margin, the inner pair of which are longer than the outer.

Described from seven female and three male specimens taken at **Phoenix, Arizona**, in August, 1926, by Mr. J. H. O'Dell, from cotton plants, and at **Calexico, California**, in September, 1926, by Mr. E. A. McGregor, from citrus foliage. All types in author's collection (Reg. Nos. 1155, 1413).

This species may be distinguished from *H. phaseoli* Hood, as follows: in *gossypii* the antennæ are about twice as long as the head, and head is .2 longer than prothorax; wings have three darkened cross bands and are about seventeen times as

long as width at middle; in *phaseoli* the antennæ are 2.4 times as long as the head, head and prothorax of equal length, and wings thirteen times as long as width in middle. *H. gossypii* may be distinguished from *indicus* Bagn., the cotton thrips of India, by its lighter body color, smaller size, more slender wings, and different sculpturing.

ODONTOTHRIPS CALIFORNICUS Moulton, 1907

This species was originally described as a variety of Haliday's *Odontothrips (Thrips) ulicis*. Dr. H. Priesner's recent studies (Ref. Die Thysanopteren Europas, 1926, Part I, p. 222), show that the "*ulicis*" Haliday's group have two strong teeth at the end of the fore tibiæ, while the "*lati*" Hal. group has only one tooth and the second is represented by a bristle-bearing wart. *O. californica* Moulton belongs to the second classification and the name "*ulicis*" is misleading and therefore withdrawn. This species is closely related to *O. lati* Hal.

Rhopalandrothrips corni Moulton, new species

Female, holotype. Color pale yellowish white, pterothorax slightly orange-yellow. Antennæ: segments one, two, basal half of three, and basal third of four, yellowish white, distal half of three light grayish brown, outer half of four and five to eight dark grayish brown. Wings transparent, veins yellowish white, prominent spines brown. Crescents of ocelli bright orange.

Measurements: Total body length .83 mm. Head, length .066 mm., width .11 mm.; prothorax, length .083 mm., width .13 mm.; pterothorax width .166 mm. Length of antennal segments, I, 15 microns; II, 30; III, 45; IV, 37; V, 30; VI, 45; VII, 9; VIII, 12; total length 225 microns.

Head transverse. Eyes prominent, protruding, facets large, pilose. Ocelli well developed. Interocellar spines prominent 39 m. long and placed near inner anterior margin of posterior ocelli. Mouth cone long, pointed, reaching beyond posterior margin of prosternum. Antennæ almost three times as long as head, five smallest and six largest of intermediate segments.

Prothorax with two long spines on each posterior angle (39 m.) and a third pair (30 m.) along posterior margin. Wings well developed reaching tip of the abdomen, veins clearly defined, with three cross veins between costa and fore vein, one opposite forking of longitudinal veins, one near middle of wing, and the other at the tip where fore vein fuses with the costa broadly in two or three places. Posterior vein ending abruptly just before the tip. Costa bearing seventeen to nineteen spines, fore longitudinal vein with five at base and two at extreme tip, posterior longitudinal vein with

nine to ten evenly placed. Ninth abdominal segment with a row of six long spines (60 m.) along posterior margin. Tenth segment with a pair of long median spines near the tip (69 m.) and a shorter pair on the sides (45 m.).

Allotype, male. Color as in the female. Total body length .56 mm. Length of antennal segments, I, 15 microns; II, 33; III, 33; IV, 30; V, 21; VI, 84; VII, 9; VIII, 12; total length 237 microns.

Head conspicuously transverse with eyes large, rounded and occupying almost the entire side of the head. Ocelli fully developed. Sixth antennal segment four times as long as segment five and nearly three times as long as segments three and four. Prothoracic spines as in the female but shorter. Wings fully developed surpassing tip of the abdomen, veins and spines as in the female. Ninth abdominal segment with a row of six long spines along posterior margin.

Described from twenty female and eight male specimens taken at Big Trees, **Calaveras County, California**, in August, 1926, by the writer from the foliage of dogwood and maple and from *Bromus* sp. All types in author's collection (Reg. Nos. 967, 968, 970).

The female of this species is very similar to *Tæniothrips costalis* Jones, but smaller, .83 mm., as compared with 1.33 mm. in *costalis*, and by the long-pointed mouth cone. Jones describes the mouth parts of *costalis* as "short and blunt." The enlarged sixth antennal segment places this species clearly in Priesner's *Rhopalandrothrips*, and this is the first member of this genus to be recorded from California.

LIOTHRIPS VARICORNIS Hood, 1912

A collection of five specimens of thrips taken at Marysville, California, in December, 1926, by Mr. H. A. Crane, from hollyhocks, can be assigned to the species *varicornis* Hood, with the following notations: Antennal segments three, four, five, and six distinctly shorter than as given in the original description, and with a median longitudinal streak in the hind wings as in the fore pair, fading just before the tip. Otherwise, the specimens in this collection are apparently identical with *varicornis*; blackish brown in color with only the third antennal segment abruptly yellow and the longitudinal bars of the fore wings extending to near the tip. This thrips has been known heretofore only from Monterey, Mexico, taken from weeds and grass.

CALIFORNIA'S INTEREST IN THE INSECTS OF
AUSTRALIA AND NEW ZEALANDBY HARRY S. SMITH
Riverside, California

The appearance of Dr. Tillyard's new book¹ emphasizes the great desirability, or even necessity of a knowledge on the part of the economic entomologist of the insect fauna of those regions with which his country carries on extensive trade.

To entomologists and plant quarantine officials of the Pacific slope, in particular, the insects of Australia and New Zealand have a very special interest. Commerce with these countries by direct steamship lines, with its multitudinous opportunities for transportation of insect pests in either direction, makes it imperative for very practical reasons that entomologists acquaint themselves with the insect fauna of this part of the world. To California entomologists this knowledge is of special importance, for Australia and New Zealand are the native homes of our Eucalyptus, Acacias, and numerous other useful and ornamental plants which form such an important part of our flora. One interested in ornamental plants in this state cannot fail to be impressed with the fact that for some reason or other plants from this part of the world seem to be especially adapted to cultivation in California. Certainly the Eucalyptus and Acacias could not grow with greater vigor in their native home than they do here. It is believed one is justified in concluding that the same might be true of insects. The single important insect pest introduced from Australia, *Icerya purchasi*, lends support to this view. The woolly apple aphid, transported in the opposite direction, has been so severe in Australia that growers there have been forced to grow their apples entirely on the aphid-resistant root-stock, Northern Spy. Just as we in California have succeeded in controlling some of our worst scale-insect pests by the introduction of entomophagous insects from Australia, so it now appears that in Australia and New Zealand they have succeeded in controlling the woolly apple aphid by the introduction of the American parasite *Aphelinus*

¹ The Insects of Australia and New Zealand. R. J. Tillyard. (Sydney, Angus & Robertson, 1926, 560 pages, 8 plates in color.)

mali. Our greatest entomological romance is woven about two Australian insects, *Icerya* and *Vedalia*. For these and many other reasons there is a mutual interest on the part of entomologists of the Pacific Coast of North America and Australia and New Zealand in the insect fauna of these countries.

The appearance of a new book on the insects of Australia and New Zealand is therefore a matter of more than usual importance, particularly where its author is an entomologist of the attainments of Dr. Tillyard.

Insects of Australia and New Zealand is written primarily as a textbook, and for this it seems admirably adapted. The detailed discussion of the morphology, life history, distribution and fossil history of each group, as well as of classification, cannot fail to give the student an excellent grounding in the general subject. The book is not intended to be an economic entomology, yet the economic entomologist and quarantine officer will find the discussions under Economics, Distribution, and Census both interesting and valuable.

The book is full of things of interest. Among these may be mentioned the absence of native plant lice (Aphididæ) from Australia; the occurrence in Australia and New Zealand of 70 species of thrips, 130 species of mealybugs, and 281 species of ladybirds. To one accustomed to seeing thousands of Eucalyptus trees without a single insect attacking them, the mention of numerous serious pests of these trees in Australia is cause for congratulation that these trees were introduced in the seed stage rather than as nursery stock. It is a wonderful illustration of what quarantine can accomplish if we can do in practice that which is theoretically necessary to keep pests out.

There are 1251 figures in the book, many of them in color. A brief but useful bibliography is appended to each group; there is a glossary of terms and a chapter on the collection and preservation of insects. There is also a chapter on the "Fossil Record and Origin of the Australian and New Zealand Insect Faunas" which Dr. Tillyard is remarkably well qualified to write.

EUPARAGIA SCUTELLARIS CRESSON, A MASARID
WASP THAT STORES ITS CELLS WITH THE
YOUNG OF A CURCULIONID BEETLE

BY FRANCIS X. WILLIAMS

Hawaiian Sugar Planters' Association
Experiment Station
Honolulu

The Masaridæ are a small family of solitary wasps, often of rare occurrence, that are related to the Eumenidæ (Potter Wasps, etc.) but whose antennæ are swollen more or less club-like at the tip and whose wings are not or imperfectly folded longitudinally when at rest. They have a wide geographical distribution, but appear to favor regions with warm dry summers. Little is known of their life history; they sometimes nest in the ground or else attach their clay cells to stones, twigs, etc., and supply their young with pollen and honey, or in the case of *Euparagia scutellaris*, with the young of a Curculionid beetle.

Late in July, 1925, while collecting Hymenoptera in the vicinity of Lake Tahoe, in the Sierra Nevada Mountains, California, the writer found two small colonies of the little *Euparagia scutellaris*. This wasp is about 7 millimeters long and is black with some pale yellow markings, and as Bradley, in his excellent "Taxonomy of the Masarid Wasps" (University of California, Pub. Tech. Bull., Entomology, I, 1922), remarks, is "Stout, form somewhat *Oxybelus*-like," *Oxybelus* being a small fly-catching Sphecoid wasp. It was nesting in the hard ground, in one case on the slope of an exposed gravelly pit; the burrows which were not deep, terminating in one or more cells, and were surmounted by a delicate and slender curved tube of clay. The cells, in some cases contained a wasp grub and were packed with semi-paralyzed footless, dirty whitish beetle grubs, and an *Euparagia* carrying one such grub was captured and preserved. A specimen of this *Euparagia* provender was sent to Dr. A. G. Böving of the United States National Museum, for identification. Dr. Böving has kindly written as follows: . . . "The dried-up specimen sent me for identification is a pupa still covered with the larval skin. . . . The parts examined

under high power show that the larva is a small Curculionid larva. The pupa extracted was submitted to Mr. H. S. Barber, coleopterist in the National Museum. Without giving a definite determination he suggested that it might be a species of *Ceuthorrhynchus* and the larval characters agree with those given for *Ceuthorrhynchus* by Dr. P. V. Isaac in "The Annals of Applied Biology, Vol. X, 1923."

The habit of *Euparagia* of making a clay tube over the nest-hole is common to some *Odynerus* and also to the European Masarid, *Ceramius lusitanicus* Klug., and to others. The carnivorous habit is perhaps not unique for the family, but seems to be recorded here for the first time among the Masaridæ.

Species of the genus *Pseudomasaris* are sometimes abundant in the Sierra Nevada Mountains. They construct clay cells, and from the regularity with which some of these wasps visit certain flowers one can hardly escape the inference that they are nectar or pollen gatherers. C. H. Hicks has shown that the large *Pseudomasaris vespoidea* (Cresson) is a pollen-provisioning wasp (Can. Ent., LIX, pp. 75-79, 1927).

ON THE IDENTITY OF MICRA RECTA GN.
(LEPID., PHALÆNIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN
Decatur, Illinois

The type of this name, described 1852, Guenée, Spec. Gén., VI, Noct., II, 245, as questionably from Sierra Leone was placed in the Guenée collection with other examples of *Eublemma obliqualis* (Fabr.) received by Guenée from North America.

Guenée placed on the pin of the type a label saying that his generic reference and the locality given for the specimen were incorrect. His label also states, "C' est le No. 4 qui est l' original de ma description." There can be little doubt but that the specimen is the true type. It is in poor condition, lacking head and abdomen, but the wings are in good condition, and agree perfectly with a long series of *obliqualis* in the Barnes collection. The name *recta* should be added to North American lists as a synonym of *obliqualis*.

THE FUNKHOUSER CATALOGUE OF MEMBRACIDÆ¹

No class of books is of more value to the working entomologist than catalogues of the various groups and we all will most heartily welcome this first fascicle of this series. The 1935 species listed in this catalogue are divided into 289 genera and these into six subfamilies of which the Centrotinæ, comprising nearly one-half of the known species of the family, are largely Indo-Australian and Ethiopian in distribution; the other five subfamilies are mainly American, largely neotropical. About 200 species are known from America, north of Mexico.

Unfortunately the value of this catalogue is seriously marred by the alphabetical arrangement of the genera and species, robbing it of much of its value in taxonomic work, and leaving it but little more than an index to the literature of the family. As such an index it will, of course, be a great help to students, but we cannot but feel that the little time required to make the arrangement systematic would have immensely enhanced the value of the catalogue to those trying to determine their material. We must also object most strenuously to the abandonment of the subspecies, the value of which is only beginning to be properly appreciated by our workers. These are serious defects which it is to be hoped will not be repeated in future fascicles. Dr. Funkhouser's work on this catalogue has been thoroughly well done, and the omissions, if any, must be very few. The defects above mentioned can be corrected by the publication later of a check list arranged along scientific lines, until then we will all use this catalogue and be thankful to the author for so greatly lightening our labors.—E. P. Van Duzee.

In *Revista do Museu Paulista* (XV, pp. 205-384, 4 pl., 4 pp., errata), Dr. C. H. T. Townsend has given us a synopsis of the Muscoid genera of humid tropical America. The 605 dichotomies in the key include about 224 new generic names for which the genotypes are named. Following are descriptions of 231 new species. The paper is entirely in Portuguese.

¹ General Catalogue of the Hemiptera. Fascicle I, Membracidae by W. D. Funkhouser, Ph. D., Smith College, 1927.

TWO NEW TYPES OF DESERT BEES

BY T. D. A. COCKERELL

Last March Mr. P. H. Timberlake went out into the Colorado Desert and brought back a series of remarkable new bees, including the species now described, one a new genus, the other a new subgenus or genus according to the point of view. California is indeed full of wonders.

Xeralictus Cockerell, new genus

Male. Head rather large, subquadrate; cheeks moderate, hairy; ocelli moderate, in a curved line, remote from eyes; a more or less remote elevation runs from middle of ocellus to end of clypeus, but on front and clypeus a groove runs down the middle of it; eyes rather small, narrow; lower border of clypeus simple, not excavated or toothed; labrum broad, transverse, with a large broad outstanding basal nodule; malar space short but evident, concave, shining; mandibles large and long, the apical two-thirds not in line with the base but bent downward, producing an obtuse angle on upper margin, apex with a sharp tooth, the inner tooth indicated by a broad rectangular lamina; on inner side below the obtuse angle mentioned is a broad shining basin bounded by a steep carina below, so that the mandibles may be described as trigonal; tongue much shorter than mandibles, slender, hairy; maxillary palpi long and slender, apparently five-jointed, the joints slender and subequal, but there are really six joints, the shorter basal joint being visible on closer inspection; labial palpi four-jointed, the first joint about as long as the next two together, apical joint slender, about as long as the one before; antennæ long and slender, scape moderate, third joint conspicuously longer than fourth; middle of flagellum submoniliform; prothorax not angulate anteriorly; mesothorax and scutellum smooth, little punctured; scutellum unusually long, not bigibbous; area of metathorax short, dull, without ridges or plicæ; tegulæ not punctured; stigma lanceolate; lower division of basal nervure strongly arched, meeting nervulus a little on outer side, the nervulus not in a line with it; three cubital cells, first acutely angled at base and apex and about as long as third; second moderate, narrower above than below, the lower basal corner produced; third narrowed about one-half above; marginal cell ending on costa, not very acutely; first recurrent nervure meeting second intercubitus; second recurrent reaching third cubital cell near the beginning of its last third; legs ordinary; spur of middle tibiæ strongly ciliate; claws bifid at end; pulvillæ large; abdomen dull, the apical depressions of segments conspicuous; a broad and large, apically truncate, somewhat trilobed, lamina projecting at apex of fourth ventral segment; genitalia elongated; stipites long, slender apically, broadened basally, subangulate near middle above; sagittæ long, turned inward at apex, suggesting the forceps of an earwig; seventh ventral plate with slender curved

processes, well separated at base and strongly diverging; wings of seventh ventral broad, not lobed, recalling the wings of a maple seed; eighth ventral plate with a long median entire rod, truncate at apex, and hardly chitinized rather short transverse lobes.

Xeralictus timberlakei Cockerell, n. sp.

Length about 12.5 mm.; black, rather robust; antennæ with scape and second joint black, joints three to five red above and below, rest of flagellum black, obscure red below; clypeus and supraclypeal area dullish, without evident punctures; eyes black, inner orbits narrowly shining; front dull with minute weak punctures; front, middle of vertex, occiput and cheeks with rather long white hair; mesothorax shining, very finely and not densely punctured, media and parapsidal grooves distinct, anterior margin obtusely produced in middle; prothorax, tubercles, pleuræ, sides of scutellum, postscutellum and metathorax with conspicuous silvery-white hair, at sides of metathorax conspicuously plumose; scutellum with hardly any punctures except at extreme sides; tegulæ rufotestaceous; wings grayish hyaline, stigma and nervures piceous; legs black with appressed white hair pale yellow on inner side of basitarsi; spurs ferruginous; abdomen dullish, excessively minutely punctured, with very little hair but an even white fringe at extreme base of second segment.

Salt Creek, California, at flowers of *Nuttallia involucrata* (Family Loasaceæ), March 20, 1927 (Timberlake).

A member of the Halictine series, differing from the Siberian *Acanthalictus* by the narrow stigma, long third cubital cell, and the character of the mandibles and base of the metathorax. The shape of the third cubital cell is as in *Lucasiellus*, but the bee is otherwise quite different. The long third cubital cell at once separates the genus from the Ceylonese genus *Sudila*, which has long curved mandibles. The clypeus of *Sudila* is also quite different.

Andrena (Megandrena) Cockerell, n. subg.

Male. Rather large very hairy bees, with very pale yellow clypeus and lateral face-marks; head large and broad; face very broad, eyes diverging below; labrum transverse, densely hairy; mandibles long, rather slender, falciform, the inner tooth represented by an obtuse angle not far from apex; lower side of mandibles with a long fringe of white hair; malar space very short; tongue short, narrow, not nearly as long as the mandibles; maxillary palpi with six short subequal joints, rather exceeding blade of maxilla which is broad, dark and densely chitinized; labial palpi four-jointed, the first joint curved, not as long as the other three together, the latter being subequal; ocelli fairly large, in a curve, remote from eyes; antennæ only mod-

erately long, third joint elongated, fully as long as next two combined; mesothorax and scutellum dullish, feebly sculptured; area of metathorax dull, without plicæ; tegulæ very hairy; wings with stigma very small and narrow; lower section of basal nervure straight except at lower end where it is gently curved, ending just apicad of the oblique nervulus; marginal cell rather narrow, ending obtusely on costa; three cubital cells, the first a little longer than the third but second very broad, narrower above but still as long as third on marginal nervure; first recurrent nervure joining second cubital cell at about the beginning of its last fourth; second reaching third cubital cell not very far beyond middle, the third cubital cell being much elongated, the outer intercubitus bulging outwardly at end; legs ordinary with long abundant hair; claws bifid; pulvilli large; abdomen with broad entire hair-bands; venter densely hairy; genitalia thick and massive, the lateral pieces consisting of broad rounded convex lobes, from the lower side of each coming a long slender process directed apicad and having a large, broadly clavate apex; sagittæ much shorter, but the long slender uncus projecting far beyond; seventh ventral plate with outwardly directed pointed lobes, beset with a very long fringe of hair, and with broad thinly chitinized wings; eighth ventral plate with a broad heavily chitinized process, densely hairy at end, the lateral processes poorly developed.

Andrena (*Megandrena*) *enceliæ* Cockerell, n. sp.

Length, 15-16 mm.; black, densely covered with long white hair, forming dense entire bands on abdominal segments beyond the first; clypeus very pale yellow with two black spots; lateral face-marks pale yellow, filling the broad spaces between the clypeus and eye, except a black stripe going halfway down at sides of clypeus; mandibles black, their inner angle slightly reddened; eyes black; antennæ entirely black; mesothorax slightly shining, very finely and inconspicuously punctured, covered with long hair; tegulæ black, hairy; wings clear hyaline, apical margin faintly clouded, stigma and nervures black; legs black with white hair, that on inner side of basitarsi bright orange; spurs red; abdomen dullish, very finely punctured, first segment covered with long white hair, the others with white hair-bands, the hair at apex slightly yellowish.

Near **Salt Creek, California**, at flowers of *Encelia farinosa* (one of the Compositæ), March 19, 1927 (Timberlake). Two males.

Related to *Opandrena* (type *cressonii* Robertson), but differing by the small stigma, very broad cubital cell with recurrent nervure subapical, and shorter middle joints of maxillary palpi. Compared with *Pterandrena* (type *accepta* Viereck), there is closer resemblance in the small stigma but the second cubital cell is quite different. In Viereck's table (1904) of the Opan-

drena and Pterandrena of the northwest it runs next to the much smaller *A. trevoris* Ckll. except that the abdomen is distinctly though finely punctured. *A. trevoris* is about 9 mm. long. This must, I think, be considered a distinct subgeneric type, or genus if we follow the method of Robertson. The third antennal joint, seen from in front, is about 560 microns long, the following two together being 480. It is impossible to find any closer affinity with existing forms and we have another of the curious isolated types of recent bees.

TWO INTERESTING BEETLES FROM CARLSBAD CAVERN

BY WARWICK BENEDICT

Lawrence, Kansas

In July last I had the pleasure of accompanying an entomological expedition from the Kansas State University to the Texas Panhandle, southeastern New Mexico, and the so-called Big Bend section of southern Texas. Collecting was quite good in several orders, particularly in the Coleoptera, to which I gave my undivided attention, laying up pleasurable work for the winter months.

Upon returning, the first material examined was a series of four species taken while exploring the "Bat Cave," a section not open to the public but connected with the Carlsbad Cavern of New Mexico, our latest national monument. Two of these species proved to be rather common representatives of the genus *Trox*, but the others apparently constitute an undescribed species and a subspecies. The most interesting of the two is a Carabid which, on the advice of Mr. H. C. Fall, is referred to the genus *Rhadine* where it undoubtedly belongs, although in habitus it bears a greater resemblance to the drawing of *Comstockia subterranea* Van Dyke (Jour. N. Y. Ent. Soc., XXVI, 1918, p. 179), than to any described species of the former genus.

***Rhadine longicollis* Benedict, new species**

Form slender, elongate; head and prothorax rufo-piceous; elytra and femora red-brown with tibiae and tarsi but little lighter, antennae testaceous; head rhomboidal, elongate and narrowed behind with subglobular condyle, subequal in width to prothorax, the latter being just perceptibly wider; front tumescent and smooth medially, flat-

tened toward eyes and longitudinally rugulose; antennæ slightly more than one-half the length of the body, the third joint longer than first and second combined and one-fifth longer than fourth; pubescence beginning on fourth joint; eyes rather small and not prominent; posterior superciliary puncture about midway between eye and condyle; mentum emarginate, the depth equal to one-third the breadth; tooth well developed with emarginate apex; prothorax elongate, nearly twice as long as wide, widest at middle and evenly arcuate to slightly emarginate apex but visibly sinuate at basal fourth; base somewhat wider than apex and more strongly emarginate with well-rounded angles; anterior angles blunt; lateral margins finely and acutely reflexed; marginal setæ at about apical third, no setæ at posterior angles; disc moderately convex, impunctate and polished although faintly alutaceous, increasingly so basally; median impressed line strong and extending nearly to base and apex; basal fovæ linear but broad, shallow, and inconspicuous; prosternum in front of coxæ compressed and acute at summit; elytra elliptical, rather strongly convex, twice as wide as prothorax and nearly twice as long as wide, broadest at middle, the sides regularly arcuate with scarcely a trace of apical sinus; densely alutaceous, opaque, striæ faintly and intermittently impressed; sparsely, obsoletely, and irregularly punctulate, intervals flat and impunctate; margins finely reflexed from base to apex; apices separately rounded, but very minutely dehiscent and not at all prolonged; three dorsal punctures on third interval; under surface rufo-piceous, lighter toward sides, moderately shining but alutaceous throughout; legs long and slender as usual in this section; length 10.5 mm., width 3.2 mm.

Of the described species, *longicollis* seems to be nearest to *myrmecodes* Horn and from this it differs widely in the posteriorly more prolonged head, more elongate prothorax with rounded basal angles, compressed prosternum and strongly convex elytra with subobsolete sinus. In the good series at hand there seems to be no noteworthy variation other than in size. Length, 9-11 mm.; width, 2.8-3.4 mm. The color differences are slight. In a few examples the head, thorax, and abdomen are scarcely darker than the elytra, very possibly due to immaturity.

Holotype male and allotype female to be deposited in University of Kansas collection. Paratypes in my own collection; also paratypes taken by R. H. Beamer, Philip A. Readio, and Lyle A. Stephenson in the University of Kansas collection.

The subspecies under consideration belongs near *Embaphion contractum* Blais. and while apparently not entitled to specific rank seems worthy of a varietal name, and is dedicated to

Dr. F. E. Blaisdell, who has done so much to clarify the study of the Eleodiini and to whom I am indebted for many favors.

Embaphion contractum blaisdelli Benedict, n. var.

As a description would be largely a copy of that given for *contractum* (Bull. No. 63, U. S. N. M., 1909, p. 460), it seems necessary only to set forth the salient points of difference. The sides of pronotum, instead of being constricted at basal seventh or eighth, as in *contractum*, are constricted at the anterior edge of basal bead, the true basal angles being thus only minutely exposed. In the long series at hand there is but slight variation in this feature, there being practically no tendency to deviate toward *contractum* or *planum*. The elytra in *contractum* are described as subasperately punctate, and in the four examples of that species available for study the punctuation is, if anything, more strongly asperate than as described, while the elytra in *blaisdelli* are simply punctate, there being in the most strongly sculptured specimens only a few scattered punctures minutely asperate. In size *blaisdelli* runs somewhat smaller than *contractum*, the extremes of the former being, length 13-17 mm., width 5.5-7.3 mm., while the smallest of the latter species before me is 17.5 mm. long and 7.3 mm. wide. The describer's examples, all females, were considerably larger, the extremes being given as, length 18-21.5 mm., width 9-11 mm.

The above variety is of interest as a link between *contractum* and *planum*, of whose close relationship Dr. Blaisdell expressed his conviction in the work above cited.

Holotype male and allotype female to be deposited in University of Kansas collection. Paratypes in my own collection and in that of the University of Kansas.

It is unlikely that any of the species found in the cave have existed there for any extended period and, with the possible exception of the Carabid, it seems probable that all have been introduced since shafts were sunk through the roof of the cave to facilitate the removal of guano. This I understand was less than twenty-five years ago. However, should they continue to propagate in that environment I feel that I should like to return in a few thousand years and see what structural changes time has wrought in their descendants.

ON THE STANDING OF GENUS TIBICEN LATR.

BY E. P. VAN DUZEE

In a recent paper¹ Dr. Horvath maintains that all the generic names used by Latreille in his *Familles naturelles du Règne Animal* (1825) are vernacular French names and are therefore unavailable for use in scientific nomenclature. Unfortunately I am absolutely unable to accept this view. In 1914, when preparing the paper² in which I corrected the generic assignments then used by many European hemipterists for certain of their cicadas, I went over this phase of the matter very carefully and concluded that we had no alternative but to accept as valid Latin names, all names in Latreille's 1825 work that are given in correct Latin form. In reaching this conclusion I consulted with several students who were thoroughly competent to pass on such a question of nomenclature. Dr. Horvath now decides that in this work Latreille uses the Latin word Tibicen in a *French sense*, and on the strength of this establishes a new genus *Lyrastes* for *Cicada plebeja* of Scopoli and thus changes the generic name of nearly all of the large and well-known cicadas of the eastern United States.

I certainly have no objection to making any *necessary* correction in the nomenclature of our insects, and think it should be done at the earliest possible date as a means of stabilizing nomenclature, but I can see no occasion for making repeated changes on a fine point of interpretation that has no connection with the International Rules, and to which a large portion of our students certainly will never agree. It is the constant recurrence of such arbitrary changes that is driving our entomologists toward *nomina conservenda* which eventually would break down our entire system of nomenclature. I maintain that no change should be made unless absolutely necessary to make our nomenclature conform to the International Rules. As stated, the case of Tibicen has nothing to do with these Rules. The logical thing to do is to admit that an author may use both Latin and vernacular names in the same book, and to retain Tibicen for the cicadas related to *plebeja*.

¹ Les Noms Génériques de nos Trois Grandes Cigales Indigènes. Ann. Mus. Natl. Hung., XXIII, p. 93, 1926.

² Can. Ent., XXVIII, p. 387.

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly by the Pacific Coast Entomological Society
in co-operation with the California Academy of Sciences

E. P. VAN DUZEE, Editor S. B. FREEBORN, Ph.D., Treasurer

A number of our entomologists have been in the field again this summer. Dr. E. C. Van Dyke spent about eight weeks collecting in Oregon, eastern Washington, and northern Idaho. Mr. J. O. Martin made a trip to the Big Bend country of Texas in April and May and Mr. E. P. Van Duzee collected about two weeks around Truckee, California, and another week or two about Reno and Nixon at the southern end of Pyramid Lake, Nevada. These three expeditions will add about 20,000 insects to the collections of the California Academy of Sciences.

Mr. C. L. Fox left on August 9 for England where he will remain for a time with his brother in London. His many friends here hope he may soon return with his health fully restored.

Dr. W. J. Holland of the Carnegie Museum was a most welcome visitor at the Department of Entomology of the California Academy of Sciences. Among other visitors to this department of the Academy during the summer may be mentioned Dr. J. M. Aldrich, Mr. A. C. Baker, Mr. J. A. Hyslop and Mr. and Mrs. S. F. Blake of Washington, D. C.; Mr. George P. Engelhardt of Brooklyn, Prof. Paul P. Lawson of Lawrence, Kansas, and Dr. and Mrs. E. G. S. Titus of Salt Lake City.

We would call attention to Part V of the Guide to the Insects of Connecticut, on the Odonata or Dragon Flies of Connecticut, by Dr. Philip Garman. This Guide will serve as an excellent handbook to the dragon flies of the eastern United States. The monographic character of these Guides is making them indispensable to our entomologists.

The 1926 Report of the Provincial Museum at Victoria, B. C., like its predecessors, contains entomological papers of much value. This issue has a report on entomology devoted to the insect fauna of the Garibaldi Park District, with one plate of Noctuids, and a paper by G. A. Hardy on the Buprestidæ of Vancouver Island, with two plates.

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San Francisco, California

1927

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in July, October, January and April by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Annual subscription \$2.00 in advance for the United States and Canada; \$2.25 for foreign countries. Subscriptions should be sent to the treasurer, Dr. Stanley B. Freeborn, University Farm, Davis, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

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Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.

The Pan-Pacific Entomologist

Vol. IV, No. 2

October, 1927

STUDIES IN THE MELYRIDÆ NO. 6

BY FRANK E. BLAISDELL, SR.
San Francisco, California

Recent studies in the genus *Trichochrous* shows very clearly that the *conformis* of LeConte is not identical with *suturalis* LeConte, as suggested by Casey. I have before me a large series of *suturalis* collected at San Diego, California, during the late eighties and early nineties, and a recently collected series of *conformis* taken on the Laguna and Cuyamaca Mountains of San Diego County. My series of *suturalis* was passed on by Colonel Casey. This species has never been adequately described, for it stands almost unique in the development of the humeral angles and basal angles of the pronotum, especially in the more strongly developed individuals. The salient differences between the two species can best be stated as follows:

Suturalis Lec. More robust, head and prothorax relatively large (male), basal angles of the pronotum explanate, strongly chitinized, distinctly rectangular to subacute and more or less prominent laterally; humeral angles likewise explanate and rectangular to prominent laterally, adapted to the pronotal basal angles. A line of white hairs, varying in width, along the sutural margins from about the scutellum to the elytral apex; whitish hairs on the deflexed sides of the elytra and gradually scattering on the disk and apical area. In the male the elytra are gradually narrowed behind from the base. The humeral and basal angles in the female are quite like those of the male and the former sex differs, as LeConte says, in having the sides of the elytra parallel. In both sexes the pronotum is narrowed anteriorly and more or less sinuate before the basal angles.

Conformis Lec. Less robust, parallel and more elongate. Humeral and pronotal basal angles never as strongly developed as in *suturalis*. The angles usually obtusely rounded and therefore not explanate or subacutely prominent laterally. Cinereous hairs arranged about as in *suturalis*, except that the sutural line is feebler or absent, the marginal line being heavier and better defined. The sides of the pronotum are more arcuate, less convergent anteriorly and less sinuate posteriorly. Color intense black and shining, while in *suturalis* it is duller. The two species are quite closely related.

The present opportunity is taken to describe two new species as follows:

***Trichochrous albertensis* Blaisdell, new species**

Form oblong-oval, sides of pronotum and head noticeably convergent anteriorly, moderately convex, a little more than twice as long as wide. Color black; legs clear rufo-testaceous; antennæ pale toward base, distal joints more or less piceous, basal joint black; mouth-parts more or less pale. Luster shining.

Pubescence not dense, not completely hiding the general surface, short and recumbent, without erect hairs; color flavo-cinereous. Lateral pronotal fimbriæ short, regular and cinereous; lateral elytral fringe a little longer, less close, regular and also pale. Hairs of the under surface of body a little longer and recumbent.

Head moderate in size, across the eyes very little wider than the pronotal apex, about as long as wide; front slightly and broadly impressed between the eyes, punctures small, distinct and in the central area separated by a distance equal to two or three times their diameter; surface more or less finely rugulose, with a slightly convex and glabrous area at middle against the epistomal base. Eyes moderate in size and moderately convex. Antennæ short, extending to about basal third of the pronotum.

Pronotum about a fourth wider than long, moderately convex; apex feebly arcuate to truncate in feeble circular arc; sides moderately and evenly arcuate in basal half, thence anteriorly nearly straight and convergent to apex, apical angles moderately broadly rounded; base broadly and moderately arcuate, continuously so with the sides, basal angles completely obsolete; disk noticeably more strongly declivous and very feebly compressed antero-laterally; very sparsely punctate, punctures well defined and rather small, separated by a distance equal to three or four times their diameter, interstitial surface smooth to the margins.

Elytra oblong, scarcely twice as long as wide, quite evenly convex from side to side; base transverse, scutellum transverse and densely clothed with fine pale hairs; humeri moderately rounded, very feebly tumid; sides parallel, not arcuate; apex broadly but not strongly rounded from middle third, margins narrowly and distinctly explanate from just behind the humeri, broadening apically into the general surface of apex; surface feebly undulate, punctures about same size as those of the pronotum becoming finer on the apex.

Abdomen extremely finely punctato-rugulose. Legs rather slender, the anterior and middle noticeably shorter than the posterior.

Male, the only sex at hand, has the fifth ventral abdominal segment truncate at apex, scarcely feebly sinuate.

Measurements. Length, 3 mm.; width, 1.2 mm.

Holotype, male, and one paratype of same sex in my own collection. Other paratypes in the collection of Mr. F. S. Carr, of Medicine Hat, Alberta, Canada. Collected by Mr. Carr on June 26, 1924.

Type locality. Medicine Hat, Alberta, Canada.

Albertensis is to precede *simulans* Casey according to Casey's table. It differs from that species by the shorter antennæ, more strongly convergent sides of the pronotum, narrowly explanate sides of the elytra which is noticeable when viewed from above, sparsely punctate pronotal disk and shorter lateral pronotal fimbriæ. *Simulans* Casey occurs at El Paso, Texas. My single male specimen is from Fort Bliss, Texas. *Modestus* Casey has pale elytra and is found in Kansas. I have several closely related and undescribed species. A generic revision of the Melyridæ is under way.

Trichochrous fieldii Blaisdell, new species

Form parallel oblong-oval, moderately convex, pronotum noticeably narrower than the elytral base. Color black; antennal base and mouth-parts sometimes piceous; femora piceous, basal articulations more or less rufous; tibiæ and tarsi rufous, the former at base and terminal joint of tarsi blackish. Luster shining, pronotal disk especially so; in bright light somewhat æneous.

Pubescence short, recumbent, rather sparse and not hiding the general color of the surface; color ashy-gray. Pronotal lateral fimbriæ pale, equal in length and moderately short, closely placed; those of the elytral margins rather short and more widely spaced. On the under surface of the body the hairs are recumbent and rather short; finer on the head.

Head not wider than the pronotal apex, muzzle of moderate length. Eyes moderately prominent, not coarsely faceted. Front not convex, sparsely and rather finely punctate, punctures somewhat larger and slightly denser laterally and the surface feebly rugulose, behind the epistomal base the surface is quite glabrous; vertex and occiput more strongly punctate. Antennæ rather slender, not serrate anteriorly, very gradually and rather feebly incrassate distally; third joint obconical, noticeably elongate; joints 4-10 subtriangular, fifth distinctly triangular and slightly larger than the contiguous joints.

Pronotum about a third wider than long, apex subtruncate, scarcely narrower than the base; sides moderately arcuate, feebly subangulate at basal third, arcuately convergent anteriorly and rounding broadly into the arcuate base, basal angles absent; apical angles obtusely rounded and not in the least prominent anteriorly; disk moderately convex, sparsely punctate in the central area; punctures moderate, not impressed and separated by a distance equal to two or three times their diameter, laterally punctato-reticulate sometimes rather broadly so, interstitial surface of the central area glabrous and polished.

Elytra a little more than twice as long as the pronotum and less than twice as long as wide; base emarginate, humeri rather narrowly rounded, umbones moderate; sides parallel, very feebly arcuate, somewhat gradually rounded at apex, sutural angles rounded, slightly dehiscent; disk slightly flattened centrally and toward base, evenly

and arcuately declivous laterally, abruptly so at humeri. Punctures not dense, fine, separated by a distance equal to two or three times their own diameter; surface extremely finely rugulose. Abdomen finely punctate, surface very finely and more or less transversely rugulose.

Male, the only sex studied. Fifth ventral segment truncate at apex. Lateral spurs of the anterior and middle tibiæ thickened. Both spurs of the hind tibiæ equal in size and slightly robust.

Measurements. (Type) length, 3.2 mm.; width, 1.2 mm. Described from six males, the smallest measured, length, 2.8 mm.; width, 1 mm.

Type locality. Rainbow, northern part of San Diego County a short distance south of the county line from Riverside County. One specimen was collected at Ethanac in Riverside County some thirty miles directly north of Rainbow. Specimens collected on April 9, 1926, by Mr. George H. Field.

Holotype, a male, which, with paratypes, is deposited in the collection of the California Academy of Sciences. Paratypes are also placed in Mr. Field's collection at San Diego.

Fieldii appears to be most closely related to *fulvotarsis* Bland, from which it differs in the more elongate elytra, shorter and sparser pubescence, longer, more slender and not serrate antennæ, as well as in the more prolonged muzzle. *Fulvotarsis* occurs on the blossoms of *Grindelia* in the vicinity of east Oakland, Alameda County, California.

Listrus medicatus Blaisdell, new species

Form elongate-oval, slightly narrowed anteriorly, moderately convex. Color black; distal portion of tibiæ and tarsi piceous. Luster shining.

Pubescence short and recumbent, moderately dense and plumbeo-cinereous in color with distinct maculæ and a vitta of black hairs arranged as follows: Four basal spots, humeral and juxta-scutellar, the latter not confluent across the suture, the former smaller; post-basal, at middle of each elytron, of moderate size; submedian fascia well formed, transverse, interrupted at suture, not quite attaining the lateral margins, anterior margin irregular; subapical row of four maculæ, each nearer to suture and lateral margin than to each other; apical macule of moderate size on each elytron. Pronotal central macule hour-glass-shaped, scarcely subdivided apically and basally; lateral vittæ broken into two small spots or somewhat obsolete. Lateral fimbriæ short and pale. Hairs of the body beneath not dense or long, and similar in color.

Head moderate in size, about as long as wide, muzzle quite short, sides of the front converging rapidly before the eyes. Front feebly and widely impressed, punctures small, well defined, in the central area separated by a distance equal to two or three times their

diameter, denser toward epistomal base and sides of front before the eyes; vertex and tempora densely asperato-punctate; a very small glabrous, slightly convex callus against middle of the epistomal base. Eyes moderately large, very convex and prominent. Antennæ of moderate stoutness, very feebly incrassate and moderately compressed; second joint oval and very slightly longer than wide; third subcylindrical to obconical, fourth feebly triangulo-obconical, fifth noticeably subtriangular and a little wider than the preceding and following joints; sixth to the ninth inclusive similar in form, slightly triangular, ninth slightly more robust, tenth as long as wide and slightly stouter than the ninth; eleventh about twice as long as wide and narrowed apically.

Pronotum slightly wider than long, widest a little behind the middle, strongly convex; apex arcuato-truncate in circular arc; sides moderately strongly arcuate posteriorly, less so, straighter and convergent in front of the middle, serrulations small; angles rounded, base broadly arcuate and rounding into the sides, basal angles represented by a larger serrule; disk noticeably declivous antero-laterally, moderately densely indentato-punctate laterally and less so along base; intervals of the central area flat and smooth, in part feebly indented at times, punctures separated by a distance equal to one or two times their diameter.

Elytra about twice as long as wide; humeri well rounded, not tumid or very feebly so; base transverse; disk with punctures well separated, finer apically, surface slightly undulate basally.

Legs rather slender and of moderate length.

Male. More parallel and less broadened posteriorly, sides of elytra scarcely arcuate; fifth ventral not modified on the surface, evenly and distinctly sinuate at apex. Female broader, sides of elytra noticeably arcuate; antennæ rather slender, joints slightly more elongate; fifth ventral rounded at apex, but not strongly so, apical margin very feebly deflexed.

Measurements. (Types) length, 3-3.4 mm.; width, 1.1-1.3 mm.

Holotype, male, and allotype, female, and a male paratype in my collection; other paratypes in the collection of Mr. F. S. Carr. Collected by Mr. Carr on May 11, 1924.

Type locality. Medicine Hat, Alberta, Canada.

Medicatus is to be more particularly separated from *provincialis* Blais. The latter is less elongate, smaller in size and the elytral pattern is not so strongly developed. In *provincialis*, also, the outer joints of the antennæ are more incrassate, the prothorax is relatively larger, and the fifth ventral segment at apex is more asperate. The type of maculation may be similar in both species when extreme; in *provincialis*, however, it is usually less strongly defined.

A SHORT REVIEW OF THE TRIBES ORSODACNINI
AND CRIOCERINI OF THE COLEOPTEROUS
FAMILY CHRYSOMELIDÆ WITH SPE-
CIAL REFERENCE TO SPECIES OF
WESTERN UNITED STATES

BY HAROLD R. BRISLEY

TRIBE ORSODACNINI

This tribe embraces four genera, all of which are well represented in western United States. In 1873 G. R. Crotch¹ the genus *Syneta*. He also described the one species of the genus *Orsodacna* and gave a short table of the species of *Zeugophora*, but omitted the species *Tricolema anomala* Cr., which had been described eighteen years before. Since 1892 no systematic work has been published treating of the tribe.

The tables constructed by the above mentioned authors, for separation of genera and species, were evidently based on relatively small series, and after a detailed study of characters available for use in separation, I have constructed the tables given below which I am satisfied can be used with much greater precision. Crotch based the separation of genera on the characters of prothoracic dentation and open or closed anterior coxal cavities, good characters at that time, but the former, at least, was reduced to little value upon the introduction of the genus *Tricolema*. LeConte and Horn use as their main characters the separation and prominence of the anterior coxæ and the shape of the sides of the prothorax. These characters are merely relative and can be used with precision only when comparative specimens are at hand. With the presence of more defined characters, these can better be used as secondary divisional points.

¹ Proc. Acad. Nat. Sci. Phila., Vol. 25, 1873, pp. 19-83.

² Trans. Am. Ent. Soc., Vol. 5, 1874, pp. 73-80.

³ "Classification of the Coleoptera of North America." Smith. Misc. Coll., Vol. 26, 1883.

⁴ Trans. Am. Ent. Soc., Vol. 19, January, 1892, p. 1.

It might be well to explain the limitations of the serial arrangement of the punctuation in the genus *Syneta*. This is usually definite, but in large series some females may be found where this character cannot be readily applied. In a case of this kind, if the characters of the open front coxal cavities and the lateral prothoracic dentation are used, no error can result.

KEY TO THE GENERA OF THE TRIBE ORSODACNINI

- A. Elytral punctuation at least in part serially arranged; body sparingly pubescent; front coxal cavities open behind; sides of prothorax dentate.....3. *Syneta* Lec.
- AA. Elytral punctuation entirely confused.
- B. Upper surface densely clothed with long decumbent pubescence.....2. *Tricolema* Cr.
- BB. Upper surface either destitute of pubescence or with a single erect seta in each puncture.
- C. Prothorax somewhat bell-shaped, the sides evenly rounded without lateral teeth or tubercles.....
1. *Orsodacna* Latr.
- CC. Prothorax with the sides toothed or tuberculate.
4. *Zeugophora* Kunze

GENUS ORSODACNA Latr.

This genus contains a single, widely distributed species, whose color is so variable that it has been described under ten different names. These were later reduced to six varieties of the species *Orsodacna atra* (Ahr.). A recent key to the color varieties of this species is given by W. S. Blatchley in his "Illustrated Descriptive Catalogue of the Coleoptera Known to Occur in Indiana." The species is distributed throughout the eastern United States, and in the territory west of the Rocky Mountains has been taken in Montana, Colorado, Arizona, Utah, California and Oregon. Adults are usually found on willows in the spring of the year.

GENUS TRICOLEMA Cr.

In 1874 G. R. Crotch described the genus *Tricolema*¹ from the new species *anomala*, which he also describes in the same paper. His generic description follows:

"Elongate, nearly parallel, pubescent, eyes small, head not constricted behind, anterior coxæ contiguous, first joint of the anterior four tarsi longer than the others, claws simple, epipleuræ of elytra excessively feeble."

¹ Trans. Am. Ent. Soc., Vol. 5, 1874, p. 79.

LeConte and Horn² recognized this genus and included in it the single species *anomala*. Clavareau³ and Leng⁴ both suppressed it to a subgenus under *Syneta*, evidently doing this on the assumption that the Crotch generic description did not state sufficient characters to warrant its generic rank.

After a close study of the group, I am convinced that *T. anomala* shows characters which are more than sufficient to justify its being placed in a separate genus. I am, therefore, revising the genus *Tricolema*, as described by Crotch, and placing in it the single species *T. anomala*.

It will be noted in the original description Crotch states that the claws are simple. The specimens at hand, which belong to the collection of Dr. E. C. Van Dyke, have been compared with the Crotch types, and the claws, though simple in the females, are distinctly cleft in the males. His two generic characters, the pubescence and the excessively feeble elytral epipleuræ, are, therefore, the only two characters which would serve to distinguish the genus from *Syneta*. As will be noted in the following revision, there are other good and valuable generic characters which fully justify its generic standing.

Revised description of genus TRICOLEMA Cr.

Elongate, subcylindrical, entire body above and below including the legs covered with long, dense, whitish pubescence.

Head laterally narrowed behind the eyes, not so dorsally, densely and deeply punctate, median longitudinal ridge more or less indicated by lack of punctuation; antennæ filiform, one-half to three-fourths the length of body, second segment short, about one-half the length of third.

Prothorax cylindrical, without lateral margins, coarsely punctate, distinctly widened at middle and subangulate laterally, the angulation more or less concealed by the pubescence, anterior and posterior angles distinctly prominent.

Elytra convex, the sides perpendicular or slightly incurved below the sides of the abdominal segments, epipleuræ excessively feeble, punctuation coarse, dense and confused, often largely concealed by the pubescence; a single prominent costa extends back from the umbone and is lost just before the apex,

² "Classification of the Coleoptera of North America." Smith. Misc. Coll., Vol. 24, 1883, p. 338.

³ W. Junk, "Coleopterorum Catalogus," Pars. 51, p. 36.

⁴ "Catalogue of the Coleoptera of Am., North of Mex."

while traces of two other costæ are sometimes indicated on the disk near the base.

Legs moderately long and slender; anterior coxæ contiguous, open behind, the prosternum narrowed to a mere blade between them, and posteriorly unattached; middle and posterior coxæ narrowly separated; apices of all the tibiæ fimbriate, entirely lacking terminal spines; tarsal claws of male cleft, of female simple; fifth ventral segment of male flattened and greatly elongated at middle, crowding segments two, three and four together into a space about one-half its length (Fig. 2); fifth ventral of female normal (Fig. 3).

The only genera with which *Tricolema* might be confused are *Syneta* and *Orsodacna*. It is distinct from *Syneta* by a number of characters, the most outstanding of which are:

1. The feeble epipleuræ.
2. The pubescence and confused punctuation.
3. The simple tarsal claws of the female.
4. The elongated fifth ventral segment of the male.
5. The subangulate sides of the prothorax.

Tricolema may be separated from *Orsodacna* by:

1. The open anterior coxal cavities.
2. The feeble character of the epipleuræ.
3. The pubescence of the upper surface.
4. The lack of terminal tibial spines.
5. The laterally subangulate prothorax and prominent prothoracic angles.

Until more species of this genus are found, its most logical place is between *Orsodacna* and *Syneta*, though on account of its diverse characters, its placement there is questionable.

The genus is composed of a single species *Tricolema anomala* Cr., which has been collected only in California. The insects I studied were from the following localities:

- Atwood's Mill, Tulare County, Calif., April 29, 1913 (1 specimen);
Carrville, Trinity County, Calif., April 29, 1913, (1 specimen);
Muir Woods, Marin County, Calif., May 9, 1920 (7 specimens);
Lagunitas, Marin County, Calif., April 29, 1908 (3 specimens);
Placer County, Calif. (no date), (4 specimens);
McCloud, Calif., June 26, 1914 (1 specimen);
South Fork, Kings River Canyon, Fresno County, Calif., altitude 5000 feet, July 4, 1910 (1 specimen);
Meadow Valley, Plumas County, Calif., altitude 4000 feet, June 7, 1924 (2 specimens).

Genus SYNETA Lac.

In 1892 George R. Horn⁵ published the results of his study of the genus *Syneta* Lac. In the text, as well as in the illustrations, he made the error of confusing the species *S. hamata* and *S. simplex*. The following year⁶ he published a note correcting this mistake. On account of this error his published table contains only four instead of five species. He based his division of species primarily on the form of the antennæ. A quotation from his article follows:

"Several important facts have been learned. The first is, that the characters heretofore used in separation of the species based on color, sculpture, and the mode of dentation of the sides of the thorax, have an extremely small value. The second is, that the form of the antennæ, together with the sexual peculiarities of the male, afford the only means of specific definition."

There is no doubt that these characters were an improvement over those formerly used, but even the Horn characters will be found very confusing in practice. In his search for characters, he evidently overlooked the very useful one of the presence of one or two terminal spurs on the posterior tibiæ. In his description of species he mentions the terminal spurs only in connection with *S. simplex* (corrected to read *S. hamata*), *S. ferruginea* and *S. albida*, but made no mention as to whether they were single or double. After a study of large series, this character proves to be a very valuable one, and can be used with absolute precision where the specimens are reasonably clean and well preserved.

The species *S. albida* Lec. and *S. simplex* Lec. have been much confused in collections, due mainly to their imperfect and brief descriptions. During recent years Dr. E. C. Van Dyke has successfully straightened out these two species in the collection of the California Academy of Sciences. As he has never published his observations on these species, I am using characters which he found valuable for separation.

The females may readily be distinguished by the deep semi-circular, fimbriate depression of the last ventral segment. In the males this segment is simple, and either truncate or slightly elongated posteriorly. The genus *Syneta* embraces five species, four of which are common to western United States.

⁵ Trans. Am. Ent. Soc., Vol. 19, January 1892, pp. 1-5.

⁶ Trans. Am. Ent. Soc., Vol. 20, April, 1893, p. 133.

KEY TO THE WESTERN SPECIES OF THE GENUS *SYNETA* LAC.

- A. Posterior tibiæ either ramified at apex (male of *hamata*) or with two piceous terminal spurs; antennæ with segments four to ten very nearly equal in length.
- B. Posterior tibiæ of male simple; outer segments of antennæ usually piceous or black.....1. *carinata* Mann.
- BB. Posterior tibiæ of male ramified at tip (Fig. 1); outer segments of antennæ usually ferruginous.....
2. *hamata* Horn
- AA. Posterior tibiæ with only one piceous terminal spur; antennæ with segments eight to eleven nearly equal in length and obviously shorter than those preceding.
- C. Space between antennæ subequal to the space from eye to antenna; elytra with only a few short, stiff hairs.
3. *albida* Lec.
- CC. Space between antennæ decidedly greater than space from eye to antenna; elytra with numerous long, stiff hairs.....4. *simplex* Lec.

SYNETA CARINATA Mann.

The species may be readily recognized by the use of the above table. Specimens have been taken from Alaska, Idaho, Utah, Oregon, Washington, and northern California. The native fir (*Abies*) is the preferred food plant of the species.

SYNETA HAMATA Horn

This species is easily distinguished, if males are at hand, by the unusual shape of the posterior tibiæ, which is prolonged on the inner edge beyond the insertion of the tarsi, and has a long, curved process on the posterior edge near the tip (Fig. 1). The apex of the tibiæ has two terminal spurs in the female. These are entirely lacking in the male. Specimens have been taken in Alaska, Washington, Oregon, and northern California. Its principal food plant is the Oregon vine maple (*Acer circinatum* Pursh.).

SYNETA ALBIDA Lec.

This species is closely related to *S. simplex*, and heretofore adequate divisional points have not been noted in the literature. In addition to the characters given in the key, *S. albida* differs from *S. simplex* in having the frontal space between the antennæ more conspicuously raised above the level of the front. The prothorax is more rugose and less severely angulate at the

sides. The punctuation of the elytra is more regularly arranged. *S. albida* is distinct from *S. carinata* and *S. hamata* by having only a single spur at the apex of the hind tibiæ, and by the comparative lengths of the last four antennial segments with those preceding.

The species is entirely western in its distribution, being taken only in Washington, Oregon, and northern California. It is the economic species of the genus for the adults feed on the leaves of plum, cherry, pear, peach, quince, currants, etc. Willow is probably the native food plant. The larvæ feed underground, very likely gaining their sustenance from the rootlets of the above mentioned plants.

SYNETA SIMPLEX Lec.

The confusion of this species and *S. albida* in collections is due to imperfect and brief original descriptions and to lack of intensive work on the genus. By application of the characters given in the preceding key, the two species can readily be separated. In addition, it will be observed that the frontal space between the antennæ is not as conspicuously raised above the level of the front, the prothorax is less rugose and more strongly angulate, and the punctuation of the elytra is less regularly arranged in *S. simplex* than in *S. albida*. *S. simplex* differs from *S. carinata* and *S. hamata* by having only a single terminal spur on the hind tibiæ.

The species is limited to the Pacific Northwest, having only been taken in Washington, Oregon, and California as far south as the San Francisco Bay region. The adults feed on the foliage of oak.

Syneta simplex minuta Brisley, n. var.

This variety differs from the typical *simplex* mainly in size, being conspicuously smaller. Specimens of a large series at the California Academy of Sciences measure 4 to 6 mm. in length for the variety, while typical *simplex* ranges from 6 to 8 mm. in length. In addition to size the variety has the frontal distance between the antennæ not so conspicuously wider than the distance from antenna to eye. The variety has been collected only in the vicinity of San Francisco Bay and as far south as Bryson, California. It feeds on the native species of oak.

(To be Continued)

ADDITIONAL NOTES ON SOME CERAMBYCIDÆ
(COL.) FROM VANCOUVER ISLAND, B. C.

BY G. A. HARDY AND W. H. A. PREECE

The following paper constitutes the third of a series by the authors dealing with the Cerambycidæ of Vancouver Island: the previous two having also appeared in this quarterly (Vol. III, pp. 34 et seq, and pp. 187 et seq.).

NOTHORHINA ASPERA Lec.

This species feeds in the heartwood of Douglas Fir (*Pseudotsuga mucronata* Raf.) and would appear to require two years to complete its life cycle, as it has only been bred from two-year-old stumps, whereas none were reared from similar year-old stumps in the immediate vicinity. The borings, and more particularly the emergence holes, are perfectly round, so much so that an infested stump gives the appearance of having been used as a target for a small bore rifle.

For a short period after emergence from the ovæ, the larvæ feed in the sapwood; thereafter their life is spent in the heartwood wherein they bore long straight galleries up and down, parallel with the grain, usually well within the wood, some borings being more than 2 inches in from the sapwood.

The larva when fully matured constructs a pupal cell at the bottom of a long straight gallery which is parallel with the grain and usually about an inch in from the sapwood; the length of this gallery varies from 3 inches to 8 inches. At the top end the gallery turns at a right angle and an emergence hole is partially made through the intervening wood and into the bark. Plugs of shredded wood are inserted at the point of emergence and entrance to the pupal cell, the remainder of the gallery being clear of débris. The pupal period is from four to six weeks in duration.

The adult goes through quite a contortionist's performance when gnawing its way out, turning and twisting as it gnaws round and round the edge of the exit hole, testing about every five minutes to see if the hole is big enough. When at length all is clear it turns over onto its side and works one fore leg clear, with this it obtains a purchase and levers itself out.

In each case observed, the insect promptly crawled up to the top of the stump and took cover under a slab of bark placed there for its use and the convenience of the observer!

OPSIMUS QUADRILINEATUS Mann.

Evidence has been obtained of this species breeding in Bull Pine (*Pinus contorta* Dougl.). This is an addition to the host trees mentioned in our previous note (Pan-Pac. Ent., Vol. III, p. 34).

EUMICHTHUS ÆDIPUS Lec.

In our note on this species (Pan-Pac. Ent., Vol. III, p. 188), no mention was made of its host tree, as at the time it was written the information was not available. During 1927, however, a considerable number of specimens of the typical form as well as several of the variety *ruber* H. and P., were bred from caged boughs of Douglas Fir (*Pseudotsuga mucronata* Raf.).

Owing to the presence of the workings of other Cerambycids in the same wood, it is not possible to give a detailed life history but, from the observations it was possible to make, it would appear that the larvæ bore in the heartwood and that the species has a life cycle of one year's duration.

STENOCORUS VESTITUS Hald.

Up to the present no known evidence is extant as to food plant of this species. Larvæ observed in the underground roots of a dead Douglas Fir (*Pseudotsuga mucronata* Raf.) in January, 1927, were caged, and eventually proved to be the above, the adults emerging in June of the same year. The roots were partially decayed, so that no definite burrows were traceable.

STRANGALIA OBLITERATA (Hald.)

Further investigation necessitates amendment and addition to our previous note concerning this species (Pan-Pac. Ent., Vol. III, p. 189). It was stated that the larva makes no provision for the egress of the imago and certainly this held good in all cases examined in 1926; during 1927, however, provision for egress had been made in every case examined but one, the larva having bored to the inner surface of the bark, packing the outer portion of the burrow with shredded wood, the inner with frass. The pupal cell was an enlargement of the final perpendicular boring, whereas in the 1926 cases the larva had merely pupated at the top of the burrow without making any

attempt at forming a cell. The one exception referred to conformed to the 1926 principle in every detail and the imago found was dead and so dry that it fell to pieces when touched; it is considered altogether likely that it was a 1926 specimen which had failed to emerge through lack of a prepared exit, and that none of the 1926 specimens that were dug out would have won to daylight without the assistance of hammer and chisel. It is thought possible that the abnormally hot dry season of 1926 may have caused premature pupation, the larva being caught before it had time to complete its preparations. This species has now been bred from stumps of Douglas Fir (*Pseudotsuga mucronata* Raf.) in addition to stumps of Balsam Fir (*Abies grandis* Lindl.) as previously recorded.

XESTOLEPTURA CRASSIPES Lec.

A number of specimens have been obtained from caged Douglas Fir (*Pseudotsuga mucronata* Raf.) stumps. A brief account of a portion of its life history with Balsam Fir as the host was given in a previous note (Pan-Pac. Ent., Vol. III, p. 35).

DESMOCERUS CRIBRIPENNIS Horn

Abundant evidence of the work of this species in the living stem of Red-berried Elder (*Sambucus callicarpa* Greene) was obtained this summer (1927). From the examination of many bushes the life history could be fairly estimated.

The ovæ appear to be laid at or near the forks of the small upper branches, as many very young larvæ and their burrows are to be found at these situations. They work entirely in the pith of the stem, and as they increase in size work downward into the basal portion. A considerable length of burrow is clear of frass, in which the larva travels up and down quite freely. The loose texture of the pith and the fact of the indigestible matter being tightly compacted would account for the space without the necessity of ejecting it from the burrow.

The pupal cell is the terminal two or three inches of the burrow, the interior end is closed by a tight wad of coarse frass, or rather chewed fiber, finished off smoothly with finer particles. Previous to pupation the larva bores to within the inner surface of the papery bark, and then plugs the end to the extent of half an inch with fiber, it then retreats to the posterior end of the

cell where the final metamorphosis is effected, the pupa lying with head toward exit.

The pupal stage is probably of short duration, as larvæ in the act of changing were taken along with perfect pupæ in June, the imago emerging in July after gnawing an elliptical hole through the bark. Larvæ of considerable variation in size were taken at the same time, suggesting a two or three-year existence.

No especial gall-like growths were observed, but wart-like excrescences were apparent where the wood had healed old exit scars. The stems of many bushes were completely killed by the activities of this species; only the living stem is attacked by the larvæ.

The adults emerge in June and July and may usually be found on the leaves and flowers.

ULOCHÆTES LEONINUS Lec.

The pupa of an Asilid fly, *Dasytis astur* O. S., was taken from a fresh burrow of *Ulochætes leoninus* Lec. The presumption that it preys on the Cerambycid larva is in agreement with the recorded habits of certain members of this Dipterous family.

NECYDALIS CAVIPENNIS Lec.

The larvæ of this species were taken in an old stump of Garry Oak (*Quercus garryana* Dougl.). From the presence of newly emerged adults and well-grown larvæ at the same time, it would seem that this stage extends for at least two years.

The larva works in the heartwood, its burrow and pupal cell being exactly similar to that of *N. lævicollis* (Pan-Pac. Ent., Vol. III, p. 37).

MOLORCHUS LONGICOLLIS Lec.

A fully matured specimen was dug out of a small branch of Douglas Fir (*Pseudotsuga mucronata* Raf.) on September 11, 1927. The bough was one of a quantity that had been caged indoors for a number of months and the heat of the house had perhaps hastened maturity.

This species bores in the heartwood and requires at least two years to complete its life cycle. Under normal circumstances we presume it pupates and emerges late in the fall, the imago hibernating in the pupal cell and leaving the wood in April.

Owing to the presence of borings of two if not three other Cerambycid species in the same wood it was not possible to

obtain a sufficiently clear idea of the workings of this species to enable us to describe them in detail.

CALLIDIUM VANCOUVERENSE V. D.

This recently described species (Pan-Pac Ent., Vol. III, p. 104), feeds beneath the bark of Douglas Fir (*Pseudotsuga mucronata* Raf.) and takes one year to complete its life cycle.

The adults are active during April and May and are most frequently to be found running over slash piles in the sunshine. The female when ovipositing crawls along the branches with ovipositor extended, trailing and traversing from side to side in search of crevices, etc., suitable for the purpose in hand. A suitable spot being found the ovipositor is inserted and the insect remains motionless for a few seconds, then moves on again, the ovipositor searching as before.

The larvæ spend the whole of their existence in the sapwood scoring it to the depth of 1/16 inch during the later stages. On reaching maturity the larva dips abruptly into the heartwood, turning at a right angle on reaching a depth of approximately one-half inch, and then bores a gallery parallel with the grain, varying from 1 inch to 2 inches in length; at the end a pupal cell is hollowed out, this cell being simply a slight enlargement of the gallery. The gallery is entirely cleared of refuse with the exception of a plug of shredded wood at the entrance to the pupal cell. The larva before pupating, gnaws almost through the bark at the point through which the imago will emerge.

Pupation sometimes takes place in late November and December, the adult emerging a few weeks later, spending the winter in the cell and leaving the wood at the beginning or middle of April. At other times the winter is spent in the larval stage, pupation taking place in March or early April. The latter procedure seems to be the one more usually followed.

The borings of this species in the heartwood are distinctly elliptical and bear a strong resemblance to Buprestid work, as does also the emergence hole.

PHYMATODES ÆNEUS Lec.

This species, which formed the subject of a brief previous note (Pan-Pac. Ent., Vol. III, p. 190), is a subcortical borer with a life cycle of one year's duration.

The imagines are active during May and June, and ovæ are deposited during that period on scars, wounds, etc. The slash from Douglas Fir (*Pseudotsuga mucronata* Raf.) appears to be the host most favored, from twigs less than three-quarter inch in diameter up to the largest branches, the smaller boughs having first preference. Small stumps and trunks of small dead trees are sometimes utilized.

The boring and pupating habits vary considerably, but in accordance with the locale. In the cases of stumps, trunks or branches of considerable thickness, the larvæ feed to some extent on the inner bark and make the pupal cell in the bark; in branches of medium size the pupal cell is constructed partially in the heartwood so that when the bark is removed the pupæ are found with the head and prothorax protruding from the heartwood; in small branches and twigs the larva bores right into the center of the heartwood and there forms its pupal cell; this sometimes has two borings connecting it with the inner bark, but frequently only one.

Pupation is of very brief duration, and no cases have been observed of the species overwintering in the pupal stage.

It is of interest to note that specimens emerging from stumps and trunks are noticeably larger and darker than those from small branches, due no doubt to a more plentiful supply of nutritious food.

XYLOTRECHUS UNDULATUS Say

In a note on this species (Pan-Pac Ent., Vol. III, p. 39), it was stated that Douglas Fir (*Pseudotsuga mucronata* Raf.) was believed to be the host tree most commonly utilized, though at the time proof was lacking. This statement has now been vindicated; several specimens having been reared from caged Douglas Fir stumps.

SAPERDA CALCARATA Say

The work of this species has been observed in the Aspen (*Populus tremuloides* Michx.). The trees in question are the remnant of a large grove, and were severely infected, the death of several being obviously due to this cause.

The larvæ were working only in the living trees, or the living portions of dying ones. Young larvæ were found between the bark and wood; these soon, however, bore into the heartwood

which was honeycombed with their burrows. Frass is ejected from the borings, often accumulating in conspicuous piles at the base of the tree; sap exuding from the hole is also very noticeable, causing a dark stain to appear on the bark. A marked characteristic of the burrows is the wide shallow flare at the lower portion extending in from the exit for $1\frac{1}{2}$ to 2 inches. Individual burrows measured from 4 to 6 inches in total length.

The pupal stage is passed at the inner end of the burrow, the pupal cell being formed by plugging the former, for an extent of one inch, with coarse shreds of wood fiber, finishing off the interior with finer particles. The pupa lies with head toward exit which is the opening previously used for the ejection of frass. Larvæ of various sizes were found at the same time, indicating a period of growth of about three years.

A NEW COSSID FROM NEW MEXICO
(LEPID., COSSIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

***Comadia polingi* Barnes and Benjamin, sp. nov.**

Male. Fore wing with the ground color white, irrorated with black, the costa more or less marked by a black line, base of radius marked by a black dash, the medial vein strongly black marked, other veins more or less black marked; considerable black between veins 2 and 3 on the discocellular and distad of cell, fringes checkered black and white. Hind wings fuscous.

The two females which we consider herein as the normal females of this species are similar to the males, but with the fore wings more powdered with black.

The species is close to *Comadia intrusa* B. and Benj., but differs therefrom by a more contrastingly black maculation upon a paler ground.

Type locality: Bent, Otero County, New Mexico.

Number and sexes of types: Holotype ♂; allotype ♀; 43 ♂ 1 ♀ paratypes, all June, O. C. Poling collector.

Holotype, allotype, and paratypes in Barnes collection through the courtesy of Mr. Poling, the majority of the paratypes returned to the collector.

A NEW HELMIS (COLEOPTERA—HELMIDÆ)
FROM THE NORTHWEST

BY J. O. MARTIN

During the work of incorporating the collection of the late Albert Koebele with that of the California Academy of Sciences, I came upon a series of over one hundred specimens of what seems to be a very distinct species of *Helmis*. With the permission of Mr. E. P. Van Duzee, Curator, I offer the following description.

Helmis koebelei Martin, n. sp.

Broadly oval, widest behind the middle. Head piceous, finely granulate on the front, clypeus closely, coarsely punctate. Antennæ reaching to about the middle of the thorax; basal joints ochraeous, the three apical joints piceous, and forming a distinct club.

Thorax piceous, shining, one-third wider at base than apex; slightly less than one-third wider than long; sides rounding at middle, sinuate before the frontal and basal angles; disc and apex finely, widely punctured, each puncture with a fine recumbent hair; on each side of the disc is a longitudinal fovea, deepest at the base and gradually narrowing to the middle, where it fades out, fovæ with a sharp external defining ridge.

Elytra ochraeous with a broad, transverse piceous band slightly behind the middle, which has a tendency to extend along the suture in both directions; but more strongly to the apex. Punctures of the striæ strongly impressed, the intervals rounded and broad, with scattered, minute punctures bearing decumbent, ochraeous hairs.

Underside of body piceous, variously stained with ochraeous. Legs piceous except tarsi, which are ochraeous. Length two, to two and a half millimeters.

Type, No. 2467, Mus. Calif. Acad. Sci., collected by Mr. Albert Koebele at Easton, Washington. Paratypes in the collection of the Academy and in that of the United States National Museum and of Mr. H. C. Fall.

A RARE ARADID

In a box of Hemiptera taken by Mr. O. C. Poling at Colton, California, and kindly presented to the California Academy of Sciences by Dr. E. C. Van Dyke, were two females of the rare *Aradus coarctatus* Heid. With these was a long series of *Aradus depictus* Van D. which would seem to be as abundant in southern California as about the Bay region. It probably can be found almost anywhere where the live oak grows.—
E. P. Van Duzee.

BEES BELONGING TO THE FAMILY BREMIDÆ¹
TAKEN IN WESTERN OREGON, WITH NOTESBY H. A. SCULLEN
Oregon Agricultural College
Corvallis, Oregon

The object of the following paper is to place on record the results of the writer's collecting for several years past, together with a study of material collected by others and now deposited in the collection of the Oregon State Agricultural College. An effort has also been made to include references to all published records of bumblebees taken in western Oregon, and to original descriptions of species known to occur there. About one thousand specimens of *Bremidæ* were available for study. These were collected in forty-eight different localities ranging from sea level to about 7000 feet.

Twenty-one species and seven varieties of *Bremus*¹ and four species and one variety of *Psithyrus* are recorded in the present paper. Two species of *Bremus* (*B. occidentalis* and *B. vosnenskii*) may be considered abundant. Four (*B. appositus*, *B. californicus*, *B. melanopygus*, *B. mixtus*) are common, and the remainder are relatively uncommon to very rare. All five species of *Psithyrus* are uncommon to rare.

Bremidæ, representing one or more species, are to be found in abundance in all parts of western Oregon from sea level to the snow line in the Cascades. Several individual species, however, appear to be limited in their distribution by certain conditions associated with altitude. *B. californicus* and *B. vosnenskii*, which are common at the lower altitudes, are seldom taken above 4000 feet elevation. *B. occidentalis*, on the other hand, is common at the low altitudes and also very abundant in the alpine meadows from 4000 feet to 6000 feet. *B. bifarius* var. *nearticus*, which is not uncommon above 4000 feet, is not recorded below that elevation, with the one exception given below. Too few specimens of many of the forms have been taken to determine their altitudinal range.

¹ Many leading hymenopterists (Rohwer, Lutz, Cockerell, et al.) continue to use *Bombidæ* and *Bombus*, while others (Frison, Viereck and some European workers) who have accepted the "Erlangen List" are now using *Bremidæ* and *Bremus*. Frison, 1919, p. 157, seems to justify the use of the latter names.

The writer is deeply indebted to Dr. Theodore H. Frison of the Illinois State Natural History Survey for his assistance in determining much of the material studied and for many constructive suggestions concerning this paper.

Many locality records of little importance for the more common species are omitted.

1. BREMUS NEVADENSIS (Cresson)

Cresson, 1874, p. 102, ♀, ♂, Nevada (Yarrow), Arizona (Henshaw). (Redescribed: Franklin, 1912, p. 416.)

Range: Alaska to New Mexico and east to Nebraska.

Only two specimens of this species have been taken in western Oregon.

Corvallis, ♀, VII-20, 1914 (F. I. Moe. Forest Grove, ♀, VII-29, 1916, L. P. R.).²

2. BREMUS SEPARATUS (Cresson)

Cresson, 1863a, p. 165, ♀, ♂, Pennsylvania, Rock Island, Illinois (Walsh), Canada (Saunders), redescribed: Franklin, 1912, p. 425, 428, Echo and Corvallis, Oregon.

Range: Alaska to Mexico and the Gulf of Mexico and from the Pacific to the Atlantic Coast.

This species is not uncommon in the Willamette Valley, but has not been taken elsewhere in western Oregon.

Albany, ♂, VIII-1, 1905 (Parsons). Corvallis, ♀, V-2, 1897, to IX-22, 1906 (Currin); ♂, VII-20, 1905 (Harlan), to IX-26, 1906 (Farrell); ♀, VI-12, 1924 (H. A. S.), to IX-11, 1921 (H. A. S.). Forest Grove, ♀, IX-17, 1915 (L. P. R.), ♂, and ♀, IX-17, to X-7, 1915 (L. P. R.). Hillsboro, ♀, ♂ and ♀, IX-30, 1915 (M. M. R.). Medford, ♂, VII-17, 1906 (Bennett). Monroe, ♀, VIII-6, 1904. Portland, ♀, VIII-5, to VIII-27, 1907. Salem, ♂, IX-24, 1921 (H. A. S.); ♀, IX-28, 1925 (H. A. S.).

3. BREMUS MORRISONI (Cresson)

Cresson, 1878, p. 183, ♀, ♂, Colorado (Morrison); Frison, 1926, p. 130. (Redescribed: Franklin, 1912, p. 431.)

Range: Western United States, east to South Dakota.

B. morrisoni is evidently very rare in western Oregon, since it has been taken only at two localities. It is probably confined to the lower altitudes.

Albany, ♀, VIII-2, 1905 (Parsons). Corvallis, ♀, VI-2, 1924, to VI-11, 1908 (Markel); ♀, V-1, 1914.

² To conserve space, initials only are used for collectors whose names occur frequently: A. H. A.=A. H. Amos; A. L. L.=A. L. Lovett; D. A. W.=D. A. Wilbur; G. R. McG.=G. R. McGinnis; H. A. S.=H. A. Scullen; W. J. C.=W. J. Chamberlin; M. M. R.=M. M. Rheer; L. P. R.=L. P. Rockwood.

4. BREMUS KIRBYELLUS (Curtis)

Curtis, 1835, p. lvii(*kirbiellus*). ♀, ♂, ♂. Arctic America. (Redescribed: Franklin, 1912, p. 290.)

Franklin, 1912, p. 294, Mount Hood, Oregon. (Doubtless refers to Viereck's record, 1904, p. 99.)

Range: Arctic America to the higher altitudes of Colorado and New Mexico. Viereck's record (1904, p. 99), from Mount Hood is the only record for Oregon. The species is evidently very rare in Oregon and doubtless confined to the very high altitudes. There is one unlabeled specimen in the collection at the Oregon State Agricultural College.

5. BREMUS OCCIDENTALIS (Green)

Green, 1858, p. 12, Northwest Coast of America, Fort Vancouver (Cooper) and Puget Sound (Suckley). (Redescribed: Franklin, 1912, p. 265.)

Cresson, 1879, p. 231, Oregon; Viereck *et al.*, 1904, p. 99, Corvallis and Mount Hood; Franklin, 1912, p. 272; Frison, 1927, p. 367, Olney, Mount Hood, Corvallis, Newport, Coleson, Alsea Grade (Benton County), Oregon.

Range: Alaska to New Mexico and east to South Dakota.

B. occidentalis is one of the most abundant species of bumblebees in western Oregon. In the lower valleys it seems to be more common in the wooded districts. In the mountain meadows in the Three Sisters region the writer found it to be the most abundant species August 6 to 16, 1926. It was working mostly on *Aster* at all high elevations up to 6000 feet.

Alsea, ♂, and ♀, VIII-18, 1917 (A. H. A.). Corvallis, ♀, III-21, 1926, (H. A. S.), to IX-4, 1921 (H. A. S.); ♂, VI-29, 1925 (D. A. W.), to VIII-10, 1922 (H. A. S.); ♀, VII-19, 1925 (D. A. W.), to VIII-22, 1922 (H. A. S.), Coos Bay, ♂, VI-20 and VII-19, 1926 (H. A. S.); ♀, VI-20, and VII-10, 1926 (H. A. S.). Eugene, ♂, VIII-16, 1905 (Foster). Fish Lake (Santiam Forest, elevation 3150 feet), ♂ and ♀, IX-5, 1925 (D. A. W.); Gold Beach, ♀, VII-11 and VII-12, 1925 (H. A. S.); Grants Pass, ♀, VII-4, 1906; Hillsboro, ♀, ♂, ♀, IX-30, 1915 (M. M. R.). Mary's Peak (Benton County, elevation 4000 feet), ♂, VIII-2, 1926 (H. A. S.). McKenzie Bridge (elevation 1329 feet), ♀ VIII-25 and VIII-27, 1924 (H. A. S.). Oswego, ♀, VII-10, 1907 (Georgia Ewing). Rainier, ♀, VII-17, 1907. Salem, ♂ and ♀, IX-24, 1921 (H. A. S.). Three Sisters region: Scott Lake (elevation 4650 feet), ♀, ♂ and ♀, VIII-7, 1926; and White Branch Creek (elevation 6000 feet), ♀, VIII-11, 1926 (H. A. S.). Toledo, ♀, VI-5, 1925 (H. A. S.). Wahtum Lake (elevation 3700 feet), ♀, VIII-24, 1923 (H. A. S.).

6. BREMUS OCCIDENTALIS var. PROXIMUS (Cresson)

Cresson, 1863, p. 98, ♀, Utah (Suckley). (Redescribed, Franklin, 1912, p. 270.)

Range: Western United States.

This variety is rare in Oregon. It has been taken only in the lower altitudes.

Coos Bay, ♂, VII-19, 1926 (H. A. S.). Corvallis, ♀, VIII-31, 1925 (H. A. S.), ♂, VII-23, 1925 (H. A. S.) Gold Beach, ♀, VII-10, 1925 (G. R. McG.). Salem, ♂, IX-24, 1921 (H. A. S.). Three Sisters region: Deer Butte (elevation 4650 feet), ♂, VIII-9, 1926 (H. A. S.).

7. BREMUS FRANKLINI Frison

Frison, 1921, p. 147, ♀, Nogales, Arizona (E. J. Oslar). *Morphotype* ♀ and *allotype* ♂, Frison, 1922, pp. 314-315, Oregon (C. F. Baker); Frison, 1926, p. 132.

Range: Western United States.

The only other records of *B. franklini* for Oregon, in addition to the types, are two workers taken by the author. The species seems to be rare throughout its range.

Gold Hill, ♀, VII-2, 1925 (H. A. S.). Roseburg, ♀, VI-29, 1925 (H. A. S.).

8. BREMUS HUNTII (Greene)

Greene, 1860, p. 172, ♀, "Utah Territory." (Redescribed: Franklin, 1912, p. 319.)

B. ternarius Viereck *et al.*, 1904, p. 99, Condon and Corvallis, Oregon, ♀, VII-14, 1900 and VIII-14, 1900 (Tulley). See Lutz and Cockerell, 1920, p. 519; Franklin, 1912, p. 322, Oregon.

Range: From Canada to New Mexico and east to Nebraska and the Dakotas.

B. huntii is a Rocky Mountain form rarely found in western Oregon. All specimens from western Oregon are from the Willamette Valley.

Corvallis, ♀, VI-8, 1900 (Bennett); ♂, IX-29, 1924 (H. A. S.). Salem, ♀, IX-24, 1921 (H. A. S.).

9. BREMUS EDWARDSII (Cresson)

Cresson, 1878, p. 184, ♀, ♀ (not ♂) California; Vancouver Island, B. C. (Edwards); Colorado (Morrison). "Possibly one of the last two is erroneous" (Lutz and Cockerell, 1920, p. 512). (Redescribed under name of *fernaldi*: Franklin, 1911, p. 157, and 1912, p. 323. See Frison, 1922, p. 317; 1926, p. 133.)

Range: Alaska to California and east to Colorado.

From the present records it would appear that this species may be limited in Oregon to the Willamette Valley and the coastal region.

Brookings, ♂, VII-9, 1925 (G. R. McG.). Corvallis, ♂, 1900. Gold Beach, ♀, VII-10, 1925 (G. R. McG.).

10. BREMUS EDWARDSII var. RUSSULUS Frison

Frison, 1927, p. 374, ♀, Yosemite Valley, California.

Range: Higher altitudes of California and Oregon.

Three Sisters region; Finger Board Prairie (elevation, 3825 feet); ♀, VIII-14, 1926 (H. A. S.).

11. BREMUS VOSNESENSKII (Radoszkowski)

Radoszkowski, 1862, p. 589, n. 13, ♀, ♂, T. 6, F. 1. California (Vosnesensky). (Redescribed: Franklin, 1912, p. 325.)

Frison, 1927, p. 368. Mount Hood, Olney, Waldport, Jacksonville, Ashland, Crater Lake, Oregon.

Range: From British Columbia to southern California and east to Nevada. Franklin says: "It belongs mainly to the Pacific Coast portion of the Transitional Zone, not crossing the Sierra Nevada Range to any great extent."

B. vosnesenskii is by far the most common species of bumblebee in the lower altitudes of western Oregon. It has been taken as high as 4650 feet in the region of the Three Sisters by the author, but is very uncommon at such high altitudes.

Brookings, ♂, VII-9, 1925 (G. R. McG.); ♀, VII-8 and VII-9, 1925 (H. A. S.). Cascadia, ♀, VIII-11, 1924 (H. A. S.). Corvallis, ♀, II-28, 1926 (H. A. S.), to VII-26, 1907 (V. E.); ♂, VII-17, 1925 (D. A. W.), to IX-22, 1906 (Currin); ♀, VII-1, 1923 (H. A. S.), to IX-11, 1921 (H. A. S.). Fish Lake (Santiam Forest, elevation 3150 feet), ♀, 1905 (Cate). Gold Beach, ♀, VII-12, 1925 (H. A. S.); ♂, VII-10, 1925 (H. A. S.); ♀, VII-10, 1925 (G. R. McG.). Grants Pass, ♀, IV-25, 1917 (C. W. Creel), to VII-1, 1925 (H. A. S.). Manzanita, ♀ and ♂, VII-30, 1920 (L. P. R.). Mary's Peak (elevation, 4000 feet), ♀, V-30, 1924 (H. A. S.). McKenzie Bridge, (elevation, 1329 feet), ♀, VIII-25, 1924 (H. A. S.). Mount Jefferson, ♀, September (A. L. L.). Newport, ♀, VII-13, 1905 (Davis). Oregon Mountain (Josephine County), ♀, VII-5, 1925 (H. A. S.). Portland, ♀, VI-18, 1925 (H. A. S.). Rainier, ♂, VII-17, 1907, and VIII-25, 1907 (E. Newkirk); ♀, VIII-25, 1907 (E. N.). Roseburg, VI-27, 1925 (G. R. McG.); ♀, VI-28, 1925 (H. A. S.). Sexton Mountain Josephine County, elevation 2046 feet), ♀, VI-30, 1925 (H. A. S.). Three Sisters region (Cascade Mountains); Scott Lake (elevation, 4650 feet), ♂, VIII-7, 1926 (H. A. S.); ♀, VIII-9, 1926 (H. A. S.); Deer Butte, ♂, VIII-9, 1926 (H. A. S.); Fingerboard Prairie, ♂, VIII-14, 1926 (H. A. S.). Wahtum Lake (Mount Hood region, elevation 3700 feet), ♂, and ♀, VIII-24, 1923 (H. A. S.).

12. BREMUS BIFARIUS var. NEARTICUS (Handlirsch)

Handlirsch, 1888, p. 243, ♀, ♂, ♂, British Columbia. (Redescribed: Franklin, 1912, p. 333. *B. bifarius* is described by Franklin, 1912, p. 328, under the name *Bombus edwardsii*. See Frison, 1922, p. 317.)

Frison, 1926, p. 134; 1927, p. 369, Crater Lake, Mount Hood, Oregon.

Range: Probably from Alaska to California and east to the Rocky Mountains.

With the exception of the one Forest Grove record this species has not been taken below 3000 feet elevation. It is apparently confined mostly to the higher altitudes (4000 to 6000 feet) of the Cascade Mountains, where it is common on *Aster* in the alpine meadows.

Belknap Springs (elevation 1650 feet), ♀, VIII-10, 1925 (G. R. McG.). Fish Lake (Santiam Forest, elevation 3150 feet), ♂, VII-5, 1925 (D. A. W.). Forest Grove, ♀, IV-17, 1926 (H. A. S.). Three Sisters region; Frog Camp (elevation 4700 feet), ♀ and ♂, VIII-15, 1926 (H. A. S.); McKenzie Pass (elevation 4650 feet), ♀ and ♂, VIII-12, 1925 (G. R. McG.); Scott Lake (elevation 4650 feet), ♂, VIII-7 and VIII-12, 1926 (H. A. S.); ♀, VIII-7 to VIII-13, 1926 (H. A. S.).

13. BREMUS SYLVICOLA (Kirby)

Kirby, 1837, p. 272, latitude 65 degrees, America.

Range: Alaska and western Canada.

This is a species of the far north which is here recorded for the first time for Oregon. It is apparently confined mostly to the high altitudes. One ♂, however, was taken at Coos Bay on *Digitalis purpurea*. In the Three Sisters region it was taken on *Aster* and *Epilobium angustifolium*.

Coos Bay, ♂, VI-20, 1926 (H. A. S.). Three Sisters region; Skieline Trail (elevation 5400 feet), ♂, VIII-11, 1926 (H. A. S.); west side timber line (elevation 6500 feet), ♂, VIII-11, 1926 (H. A. S.) White Branch Creek, ♂, VIII-11, 1926 (H. A. S.).

14. BREMUS MELANOPYGUS (Nylander)

Nylander, 1848, p. 236 (*melanophyge*). ♂. Sitka. (Redescribed: Franklin, 1912, p. 334.)

Viereck *et al.*, 1904, p. 99, Corvallis (Cordley) and Mount Hood, Oregon. Frison, 1927, p. 370, Olney, Newport, Mount Hood, Alsea Grade (Benton County), Marshfield, Waldport, Oregon.

Range: Alaska south to Oregon and Colorado; east to central Canada and the Rocky Mountains.

This species is not uncommon in many parts of western Oregon. It has been taken from near sea-level up to 2046 feet

(Sexton Mountain). It does not appear to be in the higher altitudes as one might expect from Franklin's report (1912, p. 337).

Clatskanie, ♂, V-16, 1925 (H. A. S.). Coos Bay, ♂, VI-20, 1926 (H. A. S.). Corvallis, ♀, III-15, 1926, to IV-24, 1922 (both H. A. S.); ♀, V-9, 1926, to VI-16, 1925 (both H. A. S.). Forest Grove, ♀, III-30, 1918 (M. M. R.). Gold Beach, ♀ and ♀, VII-10, 1925 (G. R. McG.). Grants Pass, ♀, VII-4, 1925 (G. R. McG.); McKenzie Pass (elevation 4650 feet), ♂, VIII-12, 1925 (G. R. McG.). Monroe, ♀, 1925. Mount Jefferson, ♀, VIII-17 (A. L. L.). Newport, ♂, V-16, 1915. Sexton Mountain (Josephine County, elevation 2046 feet), ♂, VI-30, 1925 (H. A. S.). Waldport, ♀, II, 1926 (J. E. Davis); ♀, IV-25, 1926 (B. G. T.). Wilson, ♂, VIII-5, 1916 (M. M. R.).

15. BREMUS SITKENSIS (Nylander)

Nylander, 1848, p. 235. ♀, ♂, ♀. Sitka, Alaska. (Redescribed: Franklin, 1912, p. 377.)

B. oregonensis (Cresson), 1878, p. 185, ♂, Oregon (Edwards); *B. oregonensis* (Viereck *et al.*), 1904, p. 99, Corvallis, Oregon (Cordley); Franklin, 1912, p. 381, Mount Hood, Oregon; Frison, 1927, p. 372, Waldport, Olney.

Range: Alaska to California and east to the Rocky Mountains.

B. sitkensis is quite generally distributed over western Oregon, although uncommon. It ranges from sea-level to over 5000 feet elevation in the Three Sisters region. It is not uncommon in the coast mountains.

Albany, ♂, VIII-10, 1917 (A. H. A.). Alsea, ♀, V-29, 1926 (H. A. S.). Alsea Mountain, ♀, III-9, 1926 (H. A. S.). Brookings, ♂ and ♀, VII-8, 1925 (H. A. S.). Cascadia, ♀, VIII-15, 1924 (H. A. S.). Coos Bay, ♂, VI-20 and VII-17, 1926 (both H. A. S.); ♀, VI-18 and VI-17, 1926 (both H. A. S.). Corvallis, ♀, III-24, 1926 (H. A. S.); ♂, VIII-8, 1925; ♀, V-18, 1915, to IX, 1926 (H. A. S.). Kings Valley, ♂, VII, 1907. Mary's Peak, ♀, VII-8, 1914 (L. G. Gentry). Rockaway, ♀, VI-27, 1920 (L. P. R.). Three Sisters region; Skieline trail (elevation 5400 feet). ♀, VIII-11, 1926 (H. A. S.); Fingerboard Prairie, ♂, VIII-14, 1926 (H. A. S.). Toledo, ♀, VI-5, 1925 (H. A. S.). Triangle Lake (Lane County), ♀, V-24, 1925 (H. A. S.). Waldport, ♀, VI-5, and VI-7, 1925 (H. A. S.). Wilson (Tillamook County), ♂, and ♀, VIII-7, 1916 (M. M. R.). Woodruff Meadows (Jackson County, elevation 3200 feet), ♀, VII-4, 1922 (W. J. C.).

16. BREMUS CALIGINOSUS Frison

Frison, 1927, p. 376, ♂, Arcata, California (C. D. Duncan, September 16, 1920).

Frison, 1927, p. 379, Corvallis, Kings Valley, Alsea, Gold Beach, Oregon.

Range: Western parts of Oregon, Washington, and California.

Alsea, ♂, VII-29, 1922, and VIII-2, 1921 (both H. A. S.). Brookings, ♂, VII-9, 1925 (H. A. S.). Coos Bay, ♂, VI-20, 1926 (H. A. S.). Corvallis, ♂, IX-1, 1924 (H. A. S.). Gold Beach, ♂, VII-10, 1925 (H. A. S.). Kings Valley (Benton County), ♂, VII-18, 1905 (Vincent).

17. BREMUS MIXTUS (Cresson)

Cresson, 1878, p. 186, ♀, ♂, Colorado (Morrison). (Redescribed: Franklin, 1912, p. 381.)

Franklin, 1912, p. 384, Oregon; Frison, 1927, p. 371, Newport, Olney, Corvallis, Waldport, Alsea Grade (Benton County), Coleston, Oregon.

Range: Alaska and central Canada south to northern California and east to Montana and Colorado.

B. mixtus is one of the more common species of the lower elevations of western Oregon. It is especially common in the lower altitudes of the Coast Mountains. This species seems to nest earlier than most others, as the first worker bumblebees to appear are usually of this species.

Alsea Mountain, ♀, III-9, 1926 (H. A. S.); ♂, VIII-2, 1925 (H. A. S.); ♀, V-5, 1923, to VII-20, 1921 (both H. A. S.). Brookings, ♀, VII-8, 1925 (H. A. S.). Corvallis, ♀, III-19, 1926 (H. A. S.), to V-15, 1898; ♂, V-28, 1915 (E. Dunn), to VIII-3, 1897; ♀, IV-14, 1926 (H. A. S.), to IX-9, 1906 (Schrack). Elam, ♀, IV-18, 1926 (H. A. S.). Eugene, ♂, VIII-21, 1921 (H. A. S.). Fish Lake, (Santiam Forest, elevation 3150 feet), ♀, IX-5, 1925 (D. A. W.). Forest Grove, ♀, III-31, 1914 (L. P. R.), to V-13, 1917 (Lane); ♂, VII-20 to IX, 1918 (both Lane); ♀, V-20, 1918 (Cole). McKenzie Pass (elevation 4650 feet), ♂, VIII-12, 1925 (G. R. McG.). Medford, ♀, VII-17, 1906. Oregon Mountain (Josephine County), ♂, VII-5, 1925 (H. A. S.). Portland, ♀, VI-18, 1925 (H. A. S.). Rainier, ♂, VII-17, 1907. Salem, ♀, IV-12, 1924 (D. A. W.). Three Sisters region; Scott Lake (elevation 4650 feet), ♂, VIII-9, 1926 (H. A. S.); Timber line, west side (elevation 6500 feet), ♂, VIII-11, 1926 (H. A. S.). Toledo, ♂, VI-5, 1925 (H. A. S.). Triangle Lake (Lane County), ♂ and ♀, V-24, 1925 (H. A. S.). Wahtum Lake Mount Hood region, elevation 3700 feet), ♂, VIII-24, 1923 (H. A. S.). Woodburn, ♀, VII-6, 1906 (Kinnison).

(To be Continued)

THE CELERY LEAF-TYER, *PHLYCTÆNIA RUBIGALIS* GUEN., IN CALIFORNIA (LEP.)

BY ROY E. CAMPBELL

United States Bureau of Entomology

The celery leaf-tyer, or celery worm, known also as the greenhouse leaf-tyer (2, 5, 10)¹ is a common greenhouse pest in the United States. It also attacks several outdoor crops, notably celery and sugar beets, and in California has caused serious loss to the celery industry. During its attacks on sugar beets considerable foliage is destroyed, but the actual damage is usually negligible, because the beets are usually well grown before being attacked and because ordinary feeding on the heavy foliage of the beet does not noticeably affect crop yields.

HISTORY AS AN OUTDOOR PEST

The first mention of this insect as an outdoor pest was in 1893, when G. C. Davis (4) reported it from Michigan as boring into the crown and feeding on the leaves of celery. Chittenden (2) reported numerous larvæ in a celery field in the District of Columbia in 1897, and observed the moths in a rhubarb field in 1898 and 1899. Forbes and Hart (6) reported a few adults and larvæ from a beet field in Illinois in 1900. The United States Department of Agriculture Yearbook for 1907 (9) mentions this insect as injurious to sugar beets in California, and Bethune (1) in 1909 reported it as sometimes occurring on celery in Ontario.

The first record of occurrence outdoors in California is in 1907 (9), but the first account of damage to celery was made by Quayle (7) in 1910 who writes that "it has been known to exist in Orange County for several years, but did not do serious damage until last year." Rogers (8) in 1911 writes as follows:

"During the past season the celery fields have suffered severely from attacks of the celery leaf-tyer (*Phlyctænia ferrugalis* Hbn.). This insect has been seen in small numbers previous to this year, but had caused no large losses. This season, however, many acres of celery were almost totally destroyed by it. The worms commenced their devastations early in September and became worse up to the time the cold weather and rains set in, and from then to the last of the season they were present in most of the fields, although they were not very active."

¹ Numbers in parentheses refer to "literature cited," p. 83.

Inquiries among growers and buyers of celery in the affected districts confirmed the foregoing, all agreeing that the damage became serious in 1909 and 1910, but that larvæ, moths, and scattering infestations had been observed for several seasons previously. In 1921 celery grown near the coast in Los Angeles County was severely damaged. It has in recent years become a serious celery-crop hazard in the vicinity of Sanford, Florida.

CHARACTER OF INJURY

The newly hatched larva spins a thin web, usually on the lower surface of the leaf, under which it feeds. At first only the epidermis of the leaf is eaten, but as the larva increases in size, holes are eaten through the leaves, and as feeding continues, these holes enlarge. More mature larvæ web parts of a leaf together or two contiguous leaves, in which sheltered place feeding continues. When only a few larvæ are present, slight damage is done, but if they are numerous the leaves may be skeletonized, and in severe attacks the plants are defoliated. Hence, the main injury to the celery crop in California from the leaf-tyer is the actual destruction of the foliage.

The larvæ also often make their way down into the heart of the plant, and feed on the sides of the stems, eating out irregular cavities which turn dark and are very unsightly. A large quantity of frass is left by the larvæ, which may become entangled in the web and leaves, greatly increasing the unsightliness of the celery.

Badly injured celery is unmarketable. Celery bunches with larvæ, webs, and frass in the foliage, or with the foliage a little eaten, or with the blotches on the stems, are greatly reduced in market value.

EXTENT OF DAMAGE

In the Orange County district, up to about fifteen years ago, from 5000 to 7000 acres of celery, valued at that time at over a million dollars, were raised annually. Owing to losses from the leaf-tyer and a disease, late blight,² this acreage began to decrease about 1911, and a sharp decline followed, until in 1916 there were less than 200 acres in the entire district. It has been estimated that one-fourth of the responsibility for this abandonment attaches itself to the celery leaf-tyer. During

² *Septoria petroselini* var. *apii*.

the period of greatest damage, just prior to and during the years of the rapid decline in acreage, 25 per cent of the bunches had to be discarded in many fields. Of those shipped, there was a considerable reduction in the market value on account of minor damage to the celery, or the presence of a few worms.

In the last few years a considerable acreage along the coast of Los Angeles County has been devoted to the raising of celery, maturing during the late summer and fall. This has been subject to severe damage by the leaf-tyer.

DESCRIPTION³

The adult is a small moth, clay brown in color, with a wing expanse of about three-fourths of an inch. The fore wings are clay brown, irregularly marked with black lines. The hind wings are gray, becoming brownish toward the ends. Both pairs of wings have a border of small black dots.

The typical position of the moth at rest is with the inner margins of the fore wings parallel and touching down the dorsum. The palpi extend rather prominently in front of the head.

The egg is broadly ovate, flattened, grayish white, but sufficiently translucent to reveal through it the color of the surface upon which it is deposited; the upper surface is shiny and iridescent. The flat, oval shape, the iridescence, and the overlapping manner in which the eggs are laid give the mass a resemblance to fish scales. As it develops, the egg turns darker, and the dark head of the embryonic larva can easily be made out through the shell. The length averages about 0.8 millimeter and the width 0.6 millimeter.

The larva when newly hatched is pale yellowish white, with a darkish head. It is about 2 millimeters long and less than half as wide. As the larva feeds, it takes on a greenish appearance. The full-grown larva is pale green or greenish yellow, and slightly translucent. Along the back there is a somewhat conspicuous green median stripe, on each side of which are double lines of white. The head is light, with faint dark spots. The surface is sparsely covered with rather long hairs. The full-grown larva is a little over three-fourths of an inch long and one-twelfth of an inch wide.

The pupa is dark, shiny brown, with conspicuous spines on the dorsum. Wing-pads and legs show plainly on the ventral side. It is slightly less than three-fourths of an inch long.

DISTRIBUTION

As an outdoor pest the celery leaf-tyer has been reported from Ontario, Canada, to Florida, and from Michigan to California and subtropical Texas. It may be found in all celery sections of southern California and is present in largest num-

³ For complete description and synonymy, see (10).

bers and has done the greatest damage near the coast in Orange and Los Angeles counties. In the El Monte section of Los Angeles County adults may be found throughout the season, but there only occasional damage is done. It occurs in Ventura County and a few specimens have been taken at Davis, in the Sacramento Valley. Other records of occurrence as an outdoor pest are Sanford, Fla.; Baton Rouge, La.; Moreton, Delaware County Pa.; Alameda, Brownsville, Childress, and San Benito, Texas; Diamond Springs, Norfolk, and Shelton, Texas.

LIFE HISTORY IN CALIFORNIA

The moths lay their eggs on the lower surface of the leaves, or on the stems, either singly or in masses. Usually from three to eight are laid in an imbricated group, but the number may run as high as a dozen. The length of the oviposition period ranges from eight to nineteen days, averaging thirteen, and the number of eggs laid by a single female is from 48 to 176, with an average of 130.

The duration of the different stages in the life history of the celery leaf-tyer varies considerably according to the temperature, being much shorter in summer than in winter. The egg stage ranges from a minimum of four days in the summer, when the mean temperature is around 70 degrees F. to a maximum of thirty days in the winter, when the mean temperature is about 50 degrees F.; the larval stage from twenty-one to sixty-eight days. After the larva reaches maturity it ties itself up in a leaf or leaves and remains quiet for several days before turning to the pupa. This prepupal stage may last from two to ten days, and the pupal stage from six to thirty-seven days. Table 1 gives the maximum, minimum, and average number of days for each stage for the four seasons of the year, and Table 2 shows the monthly maximum, minimum, and mean temperatures for the same period. In captivity the length of the adult life was from six to thirty-four days, with an average of nineteen days.

HABITS

Soon after hatching, the young larva begins feeding on the under side of the leaves. At first only the lower epidermis is eaten, but as the larva grows it becomes more voracious and eats the entire foliage. Its leaf-tying habit soon begins to

manifest itself by the silken web with which it fastens together parts of a leaf, or two or more leaves if they happen to be in close proximity. The larva continues to feed and grow in this manner, remaining concealed in a cluster of foliage, or tied up in a single leaf. When disturbed, a larva will wriggle violently and drop down among the lower foliage or to the ground. When fully mature, the larva ties itself up tightly in a leaf or leaves, as described above, and in this protected place transforms to the pupa.

The moths begin flying about sundown, and continue to fly through the early evening. During the day they remain in hiding on the under side of a leaf or amid the foliage, and only fly when disturbed. Then they fly in a rapid, jerky manner, over the tops of the plants, and usually for a short distance only, alighting on a near-by plant, and immediately hiding under the leaves.

NUMBER OF GENERATIONS PER YEAR

From Table 1 it may be seen that during the winter the insect requires over three months to complete a generation, from oviposition to emergence of the adult; in the spring, about two months; in the summer, a little over one month; and in the fall, somewhat less than two months.

A careful check of the life-history studies carried through three seasons indicates that ordinarily there may be a maximum of five or six generations a year. Three or four of these occur during the six months from June to December, which is the active growing season for celery, and the remaining two generations occupy the balance of the year.

The generations are not entirely distinct, as there is considerable overlapping, and, while they can be observed with no great difficulty in the laboratory, they are usually too indistinct for recognition in the field.

In Table 3 is shown a continuous-generation series carried through more than a year. The first eggs from the first adults to emerge in the second and fifth generations failed to hatch, making it necessary to replace them with fertile eggs produced later. This slightly broke the continuity of the series. From eggs laid July 4, adults of the fifth generation were produced on June 18 to 23. Adding the two weeks until the end of the

year and the more than three weeks which elapsed between the second and third generations, gives ample time for the sixth generation to be produced within the year.

SEASONAL HISTORY

The main celery crop of California is practically all harvested before March 1, only a comparatively small acreage remaining later than that date. At that time the larvæ and adults are scarce, and the development of those that are present is slow.

The larvæ live on celery along drainage ditches, in the late or old abandoned fields, in old seed beds, on beets, or anywhere where their food plants are available. With warmer weather their growth and activity increase, and they will be found infesting sugar beets as well as, to a lesser degree, the celery seed beds. If a celery field is near a beet field, an infestation of the former may be expected soon after the beets are harvested, for the moths, when deprived of the shelter of the dense foliage of a mature beet field, will migrate to the celery field.

Ordinarily an infestation of any consequence occurs in the celery field about the first of September, although in some seasons it may take place as early as the middle of August. The larvæ and adults increase rapidly in numbers during September, and are very plentiful in October. By November the cooler weather, especially if there have been early rains, slows up the growth of the larvæ, and the number of both larvæ and adults becomes less. However, if warm weather continues into November, the worms will continue their activity. By December and January they will have become scarce, and only a very few can be found in February or March.

The main crop of celery is usually transplanted in July and early August and, owing to severe cutting of both top and roots, does not make much growth during the first month in the field. Hence the celery is small when infestation by the leaf-tyer begins, and the growth is very materially checked if the infestation is at all serious. Fields of excellent celery have been observed which were badly infested, and although the larvæ were finally killed by spraying, sufficient damage was done to set back harvesting more than a month.

Early planted celery usually receives the most damage, because it is exposed to infestation while the plants are small, and is ready to harvest before the larvæ have become scarce.

The later planted and marketed celery may be injured somewhat at first, but has more of a chance to recover and make a good growth, and by the time it is ready to prepare for marketing, the "worms" will have practically disappeared.

NATURAL ENEMIES ⁴

Several natural enemies of the celery leaf-tyer have been taken in the field, but usually they are not present in sufficient numbers to be of any consequence in controlling the "worms." Of the internal hymenopterous parasites found, *Rhogas rufocoxalis* Cresson was the most common and *Campoplex phthorimaeæ* Cushman was occasionally taken. It is probable that at times the egg parasite *Trichogramma minutum* Riley is quite effective.

WEATHER CONDITIONS

Development is much more rapid in warm than in cold weather. A common observation among the growers, confirmed by the writer's investigation, was that larvæ were much more plentiful and damage more severe during a warm, dry season than during one when rains came early and were followed by cool fall weather.

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⁴ See Chittenden (3) for a list of the parasites of this insect.

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Table I.-- Maximum, minimum, and average length, in days, of the different life stages of the celery leaf-tyer for the four seasons of the year at Alhambra, Calif.

Stage	December, January and February			March, April and May			June, July and August			September, October and November		
	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.
Egg	30	14	20	20	15	17.	9	4	6	12	5	8
Larva	68	53	58	61	24	42.	27	21	23.5	44	20	29
Prepupa	10	4	5.5	4	2	3.3	3	2	2.2	4	2	3.2
Pupa	37	19	30	22	15	17	14	6	11	25	8	15.5
Egg to adult	145	90	113.5	107	56	79.3	53	33	42.7	65	35	55.7

Table 2.-- Average maximum, minimum and mean seasonal temperature at Alhambra, Calif., while the life history of the celery leaf-tyer as shown in Table 3 was being studied.

	Dec., Jan., Feb.	Mar., Apr., May	June, July, Aug.	Sept., Oct., Nov.
Ave. Max.	65° F.	68° F.	88° F.	83° F.
Ave. Min.	58	42	56	52
Ave. mean	53	55	72	67

TABLE 3.--CONTINUOUS-GENERATION SERIES OF THE CELERY LEAF-TYER

Generation	Eggs laid	Egg stage days	Hatched	Larval stage days	Pupated	Pupal stage days	Adults emerged	Adults died	Adult stage days	Egg to adult days	Total of length of life, days
1	7-4-18	7	7-11	24 27	8-4 7	9 14	8-13 21	8-24 25	11	40 49	51 62
2	8-17*	5 7	8-24 26	23 25	9-16 20	10 15	9-26 10-5			38 47	
3	10-25 28	6 5	10-31 11-2	45 52	12-15 24	30 25	1-14 18	2-14 17	31	61 62	112 112
4	1-17-19*	14 17	1-31 2-3	62 63	4-2 7	17 22	4-19 29	4-25 5-2	6 14	39 102	105 116
5	4-22-19*	13 14	5-7 8	30 31	6-7	12	6-19			55 57	
6	7-13	6 7	7-19	23	8-12	6 10	8-18 22	9-23 25	36 34	35 59	71 73

A NEW RIPERSIA (HOMOP.) ATTACKING
WHEAT

BY R. W. DOANE AND J. B. STEINWEDEN

Stanford University

While examining the roots of wheat in the dry farm region in Salt Lake County, Utah, in May, 1927, we found that a number of the plants were infested with a coccid which was more or less covered by a considerable amount of white, cottony secretion. Further examination showed that the insect was much more abundant on the roots of the common June grass which covers the uncultivated lands throughout this region and which was very abundant in this field of dry land wheat. This grass is doubtless the native host for this insect. The infestations are local. Small areas a few feet or a few yards in diameter may be badly infested while other plants, near by, may have none of the coccids on them.

In the areas where the June grass is badly infested many of the insects have gone over to the roots of the wheat; sometimes 75 to 80 per cent of the wheat plants in these infested areas showed some infestation. The field where these were first found had been uncultivated for several years previous to this and was entirely covered with June grass. It was poorly disced before the wheat was sown, so the grass is still very abundant throughout the field. It is too early yet to determine whether this species will prove to be of economic importance on the wheat. It is quite possible that as the grass ripens and dries, more of the insects may migrate to the roots of the wheat. If they become at all abundant on the wheat they may seriously affect the plants. The wheat in this dry farm region usually needs all of the moisture that its roots can gather and roots infested with such a sucking insect as this cannot properly perform their function.

As the insect is apparently undescribed a description follows:

***Ripersia arenaria* Doane and Steinweden, n. sp.**

Adults covered with a considerable amount of white cottony secretion. Length on slide 2 to 3 mm. General form of body oval, somewhat elongate.

Antennæ short, six-segmented (figure F).

Leg short (figure E).

Derm with multilocular pores (figure B) and short, stout setæ (figure C) on both dorsal and ventral sides, more numerous on dorsum, especially in posterior region of body. A few small, scattered tubular ducts (figure D) on both ventral and dorsal sides. No triangular or quinquelocular pores. A few scattered, long, slender body setæ down center of body and at posterior region, both dorsally and ventrally.

Cerarii absent.

Anal ring simple with six anal setæ arranged in two groups on each side (figure A). Only a few simple anal pores.

Anal lobes inconspicuous with only one long, slender, hair-like seta.

Type locality: On roots of June grass (*Bromus arenarius*), near Salt Lake City, Utah.

Type slide deposited in Stanford University collection.

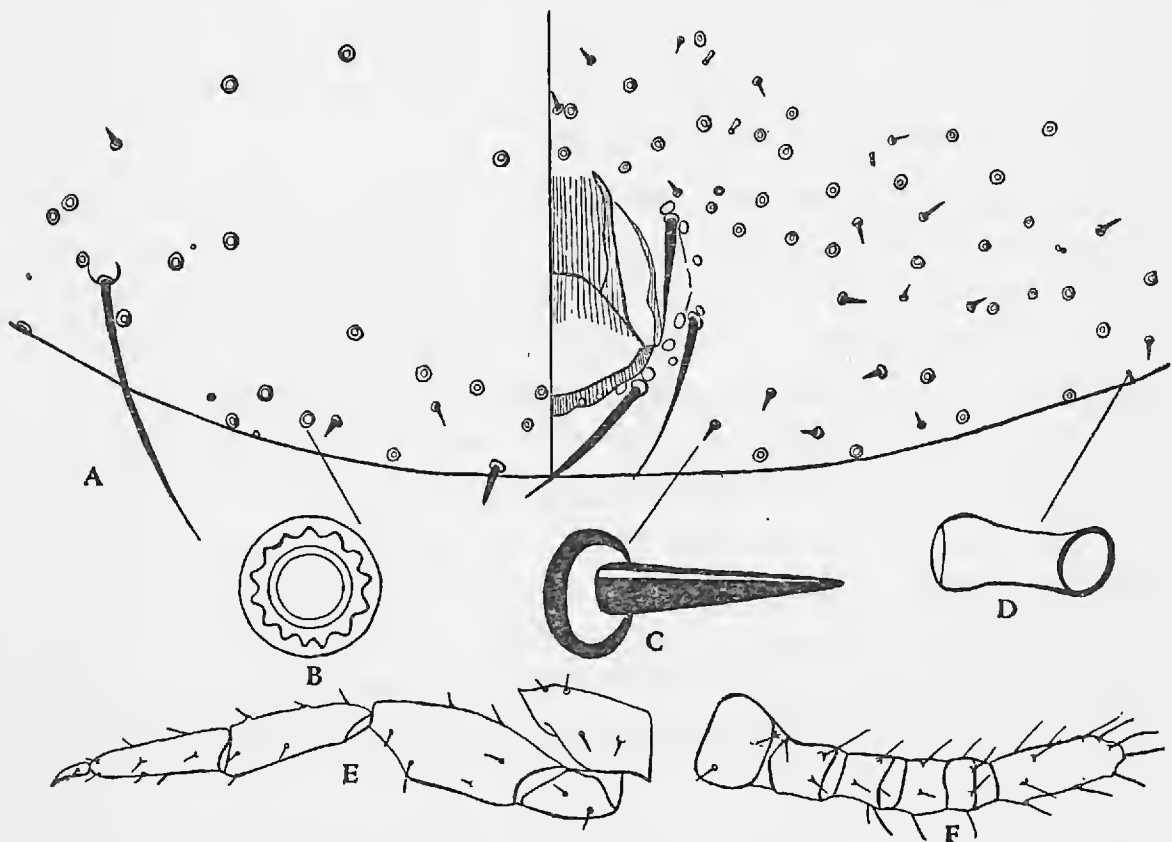


Figure A, posterior region of body; left, ventral side; right, dorsal side; figure B, multilocular pore; figure C, seta; figure D, tubular duct; figure E, leg; figure F, antenna.

SYNONYMIC NOTES (LEPID., ARCTIIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

Through the kindness of Dr. K. Jordan and Baron Rothschild, we have received a specimen of *Pygarctia oslari* Roths., and paratypes of "*Pygarctia*" *fusca* Roths., *Halisidota maculata texana* Roths. and *Hemihyalea argillacea* Roths. As the synonymy herein proposed is to be used in a "Bombycid" List we think it well to publish our version of the placement of these names.

"*Pygarctia*" *fusca* represents a species heretofore unknown to us. It appears to be a *Euchætias*; is as large, or larger, than *gigantea*; with color and maculation like *zella* save for the absence of the white discal dot of that species.

Pygarctia oslari appears to us to be only bleached out specimens of *murina* Stretch (*poliochroa* Hamps.), but pending receipt of further New Mexican material we prefer tentatively to retain the name as a race.

Hemihyalea argillacea appears to be rubbed *edwardsii*. In this regard, in material from a number of collections, we have found the names *edwardsii* and *labecula* transposed. We possess a specimen compared with the type of *edwardsii* (Mus. Comp. Zool.) and another specimen compared with the type of *labecula* (Snow Coll.), both comparisons made by Dr. McDunnough. Grote's original description of *labecula* points out that it is "less yellow than *edwardsii*, differing by the brownish thorax." Hampson, 1901, Cat. Lep. Phal. B. M., III, 131, pl. XXXIX, seems to have the two species correctly sorted. Holland, 1903, Moth Book, pl. XIV, f. 6, conveys the impression that *edwardsii* is darker than *labecula* which he puts as f. 7 of the same plate. We suspect his figure 6 simply represents a fresh specimen of the same species as his figure 7 and that both figures refer to *labecula*. True *edwardsii* is much more yellow on wing ground color and with a yellow thorax. The hyaline nature of the wings of both species seems mainly influenced by the amount the specimens have flown before being caught.

Halisidota maculata texana appears to us to be the same as *alni* Hy. Edw. There is a decided question in our minds if *alni* is distinct from *angulifera* Wlk., or if either differ enough from

eastern *maculata* for the names to be of any consequence. The species seems to enter Texas from the west via Colorado, Utah and New Mexico. We have not seen the species from the southeastern region between Texas and Pennsylvania. Eastern *maculata*, of which we possess specimens from Pennsylvania and New York north to Maine and Ontario is a very variable insect and includes within its range of variability specimens like typical *alni* and *angulifera*. The latter may, perhaps, represent an insular race (Vancouver Island) very slightly darker and brighter marked than typical *alni*, the differences decidedly obsolescent. We know of no way to sort *alni* from *maculata* save by the locality labels. We have *alni* from Mount Shasta, California (topotypical); Arrowhead Lake and Kaslo, British Columbia; Reed, Oregon; various California localities probably ranging as far south as Santa Cruz (E. A. Dodge); Reno, Nevada; Park County (Osler), Gunnison County (Lindsey), Durango and Glenwood Springs, Colorado; Stockton and Provo, Utah (Spalding); White Mountains, Arizona (Lusk); Jemez Springs, New Mexico; Texas. The larva is said to be somewhat different from eastern *maculata*. The name *agassizi* Pack. appears applicable to a local race from the coast region of California with most of the maculation often more or less obsolescent leaving the reniform darker and contrasting, the ground color often deeper than in *alni*. We have it from Solano and Alameda counties, and what appears to be much the same thing from San Luis Obispo. We cannot comment on the exact status of *eureka* Dyar, described from *Eureka, California*. It has all the tendencies of *agassizi* for reduction of transverse maculation and the intensification of the reniform, besides being heavily brown-shaded along costa, inner margin, and on and distad of the reniform. The fringes of the wings are brown instead of yellow. The name may represent a distinct species, it may be racial, color form, or possibly may be based on aberrational specimens. Tentatively we retain it as a race. The name *indistincta* B. and Mcd. belongs in the *maculata* group of the genus and may represent either a distinct species or a race of *maculata*. It is known to us from the type ♂ only, locality Santa Catalina Island. It has been figured 1912, Contrib., I, (4), pl. XIII, f. 14. It appears to have darker fringes than normal for *maculata* forms with the exception of *eureka*,

and a different subterminal line. We are inclined to consider the name represents a valid but local species. Hampson, 1920, Cat. Lep. Phal. B. M., Suppl., II, 269, sinks the name to *bicolor* Wlk., but the type of *indistincta* does not even faintly resemble Hampson's figure of *bicolor* (1901, Cat. Lep. Phal. B. M., III, 151, pl. XL, f. 4).

ON THE IDENTITY OF ACIDALIA HEPATICARIA
GN. (LEPID., GEOMETRIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

This species was described by Guenée, 1857, Sp. Gén., IX, 471. The specimen figured by Oberthür (f. 3421) is in the Barnes collection. It bears labels "Typicum Specimen," "Ex Musæo Ach. Guenée." This specimen is very probably the type. It is a *Scelolophia* close to *crossii* Hlst. *Xystrota rubromarginaria* Pac. (*ferruminaria* Zell., *rubromarginata* Pack.) is the oldest name known to us for the species heretofore going as *hepaticaria*, with *volucrata* Hlst. as the dark form.

ON THE IDENTITY OF "COSMIA" ORINA GN.
(LEPID., PHALÆNIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

ELAPHRIA GRATA Hbn.

1818 ?, Hübner, Zutr. exot. Schmett., I, 16, No. 36, ff. 71-72, *Elaphria orina* Gn.

1852, Guenée, Spec. Gen., VI, Noct., II, 10, *Cosmia rasilis* Morr.

1874, Morrison, Proc. Bost. Soc. Nat. Hist., XVII, 158, *Hadena subusta* Auct. (nec Hbn.).

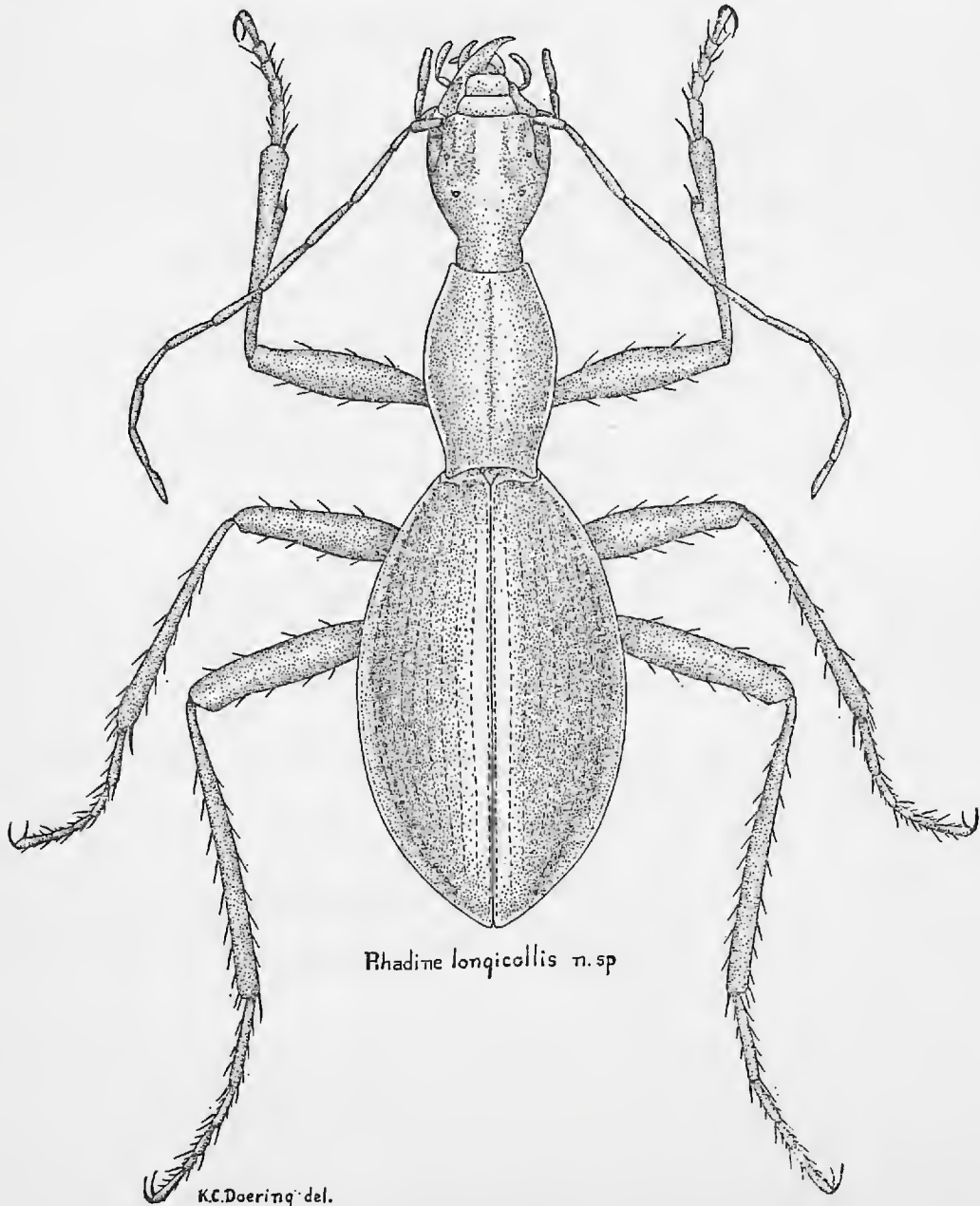
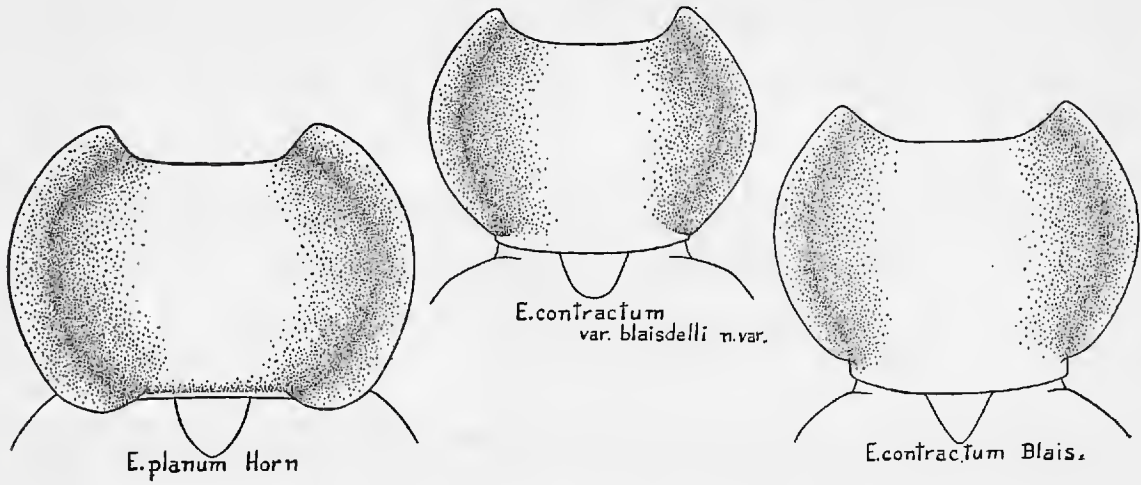
1899, Druce, Biol. Centr. Amer., Lep., Het., I, 290 (partim.), *Atethmia*.

A specimen was received from the Oberthür collection bearing Guenée's label, "Cosmia orina Gn. Spec. 678 Amer. Septentr., Baltimore (Becker)."

This specimen, which is *Elaphria grata*, may be the type of *orina*. It agrees perfectly with the original description.

The species heretofore going under the name of *orina* does not agree with the original description.

Illustrations for
TWO INTERESTING BEETLES FROM CARLSBAD CAVERN
BY WARWICK BENEDICT



See Pan-Pacific Entomologist, Vol. IV, page 44.

TABANIDS BREEDING IN RICE FIELDS

BY W. B. HERMS

Professor of Parasitology, University of California

Since the introduction of rice in California there has been an apparent increase in the number of horseflies (Tabanidæ) in counties where this crop is grown. The writer has consistently been able to collect Tabanid larvæ in roadside pools, the result of rice field drainage.

Recently an investigation of the rice fields of Colusa County was undertaken to ascertain the extent of horsefly breeding. This county is not only a large producer of rice, but is also an important dairy section, and many complaints have been received because of the punishment which dairy cattle suffer from the bites of numerous horseflies, particularly the large black and white species, *Tabanus punctifer* O. S. Anthrax is a very common disease in this county and recently cases of anaplasmosis have occurred in several of the dairy herds. Anthrax is known to be transmitted in part by Tabanids; to what extent, if any, anaplasmosis is transmitted by these blood suckers remains to be seen.

To be impressed with the seriousness of this problem one needs but visit a dairy in the vicinity of one of these great rice fields and observe the hordes of vicious flies at work on the cattle, and then strike out for the rice and note the numbers of flies flying hither and thither over the fields.

Characteristic egg masses of *Tabanus punctifer* were found in abundance (early August) adhering to the stems and blades of the rice and other aquatic vegetation. A number of these egg masses were collected and observed in the laboratory at Berkeley. The size of the dark gray-colored masses varies somewhat with the surface to which they are attached, i. e., on a narrow stem the mass in several layers may be somewhat more elongate, to about three-quarters inch, or it may be much more heaped up or wedge shaped. The number of eggs varies from about 200 to 300. The incubation period is approximately seven days. The spindle-shaped, 2 mm. long larvæ tumble out of the egg and fall upon the surface of the water (or mud) where they wriggle until the surface film is broken and they drop to the bottom and are soon lost in the mud.

The eggs appear to be invariably heavily parasitized. One extreme case alone may be cited. Two egg masses were placed in a shell vial covered with gauze, many egg masses were similarly treated and large numbers of hymenopterous egg parasites reared, but in the case of the two egg masses 561 resulted and not a single Tabanid larva emerged. With the number of adult flies already so abundant one might well imagine the extent of a horsefly plague if the present degree of parasitism were largely reduced.

How long the larva remains in this stage is unknown, but two stages, half grown and full grown, were collected in the bottom muck along the edges of the rice fields at the time stated. In this stage they are strongly predaceous and cannibalistic. The full grown, yellowish white, spindle-shaped larva measures about 4 cm. (1½ inches) in length and 6 to 7 mm. in diameter. The full-grown larva leaves the water or muck and enters the moist soil at the edge of the rice field (or along the checks) where it pupates at a distance of from four to five inches from the surface. The pupæ are highly spinose, each abdominal segment being provided with a circlet of spines near the apex. In size the pupæ are somewhat shorter than the full-grown larvæ, much more plump with the head end distinctly pupa-form.

Emergence of the adult is effected in a few days, apparently but six to seven, the exact time was not observed. The pupa case splits dorsally much after the fashion of a Cicada. There stands before me on my desk a newly emerged female *Tabanus punctifer* which although it was given the opportunity to feed on a cow, even with the skin punctured to allow blood to exude, remains stubbornly in a fast. We still have much to learn, if we are to succeed well in transmission experiments.

Dr. E. G. Titus writes us that he now represents the Gebrüder Dippe, of Quedlinburg, Germany, in the United States and Canada, and that his business address will be 416 Beason Building, Salt Lake City, Utah.—Editor.

A NEW SPECIES OF MICRIXYS (COLEOPTERA-CARABIDÆ)

BY EDWIN C. VAN DYKE

*University of California, Berkeley, California***Micrixys mexicanus** Van Dyke, new species

Robust, black, antennæ, mouth-parts and legs ferruginous, outer segments of antennæ and palpi somewhat piceous; elytra an orange red with narrow basal margin, a broad fascia slightly behind the middle, dilated at the suture and not reaching the margin, and a triangular patch at apex, broadest at suture, black. Head broadly sulcate anteriorly, clypeal margins lobular and well elevated above the base of antennæ, frons somewhat shining, and irregularly punctured. Prothorax not quite twice as wide as long, anterior margin transverse, sides broadly arcuate, widest just back of middle, hind angles sharply dentate and divergent, disc slightly convex, shallowly canaliculate and very coarsely, somewhat confluent, punctate. Elytra oval, somewhat over three-fifths as wide as long, convex, striæ well defined and coarsely, regularly punctured, intervals distinctly convex and prominent, the sutural and first less so, the second most prominent, all very finely and irregularly punctured. Beneath with entire thorax and sides of abdomen coarsely punctured, the abdominal segments at middle somewhat smooth and finely punctured. Length, 8.5 mm.; breadth, 3.75 mm.

Type, a unique female (No. 2468, Mus. Calif. Acad. Sci.), in my collection, secured near **Venedio, Sinaloa, Mexico**, June 16, 1918, by Mr. J. August Kusche and by him kindly presented to me.

This species, the second to be discovered in the genus, is readily separable from the type species, *Micrixys distinctus* (Hald.), by being slightly larger and proportionally broader, with a different color pattern, the black head and prothorax especially contrasting with the rufous head and prothorax of the other, the clypeal margins more developed, the posterior angles of the prothorax distinctly more prominent and divergent, and the elytral striæ and intervals clearly defined and with an irregularity as to prominence of the inner intervals.

A PALMACORIXA FROM MEXICO (HEMIPTERA,
CORIXIDÆ)

BY H. B. HUNGERFORD

University of Kansas, Lawrence, Kansas

The genus *Palmacorixa* was established by Dr. Abbott¹ for a new Corixid which he described from Fort Collins, Colorado, under the name *Palmacorixa gillettii*. The genus is valid, but the author's characterization of it a little unfortunate, because the metathoracic wings are not aborted in both sexes in all cases and his description of the pala of the male is specific and not generic. The following year he described *P. buenoi* from New York. Since that time these species have been reported from other states. I collected both of them from the same pond in Minnesota. The following species from Mexico collected by my friend, Dr. A. Dampf, is new.

Palmacorixa mexicana Hungerford, sp. new

Size: Length 4.85-5.00 mm. Width of head 1.45 mm., which is equal to greatest body width. In the male specimen at hand the head is .7 mm. long; pronotum .5mm.; elytral suture 1.9 mm.; distance from tip of clavus to tip of membrane 1.75 mm.

Color: Vertex of head with longitudinal median brown stripe, brown dot on interocular space near the base of each eye, caudal margin of head brown; pronotum crossed by half a dozen narrow, more or less broken, pale lines; clavus crossed by furcate and broken pale lines, basal ones much broader than those of distal half which are thin, broken and anastomosing, as is also true of corium and membrane; embolium dark on basal half; face, limbs and venter pale, but more or less embrowned.

Structural characteristics: Frontal depression on head of male large attaining the eyes laterally and surpassing them dorsally, front margin of vertex produced, faint median longitudinal carina ending in the caudally produced rear margin of the head. Interocular space both front and rear less than width of an eye; pronotum, narrow, short, surface roughened. Metaxyphus normal in shape. Anterior femur of male incrassate, produced on inner base and bearing a large stridular area; tibia carinate on front side with white fleshy disc on distal end; pala with outer margin produced and incurved; pegs in two rows, one row of large pegs (four) along the lower margin, another crescent-shaped row above, of ten pegs. The long anterior tibia and the short triangular pala with its peg arrangement

¹ Ent. News, Vol. XXIII, p. 337.

somewhat resembles those of *A. mercenaria* (Say). Strigil on right side nearly circular and composed of six rows. Second pair of wings appear to be aborted in these specimens.

Described from a male and a female taken in the Xochimilco Sea, Mexico, D. F. August 3, 1924. By Alf. Dampf.

Holotype and allotype in collection of H. B. Hungerford.

KALOTERMES MINOR (Hagen)

This very destructive termite, which works in dry wood and does not need a ground connection like most other termites, has recently been observed to have thoroughly honeycombed the old redwood timbers of one of the bastions of old Fort Ross, built by the Russians in 1812, near the mouth of the Russian River in Sonoma County. The redwood normally is moderately resistant to termite attacks, but in this case has, no doubt, had much of its tannic acid leached out through long weathering, and thus has lost its resistance.—Edwin C. Van Dyke.

UNCOMMON BUPRESTIDÆ

Acmæodera cuprina Spin. This greenish metallic beetle, normally found in Mexico and the West Indies, has been questionably kept on the list of United States Coleoptera on the strength of a single specimen supposedly taken in Texas. It may now be definitely retained, for on October 8, 1927, Miss M. E. McClelland, Assistant Curator of Ornithology and Mammology of the California Academy of Sciences, caught a specimen in Madera Cañon, Santa Rita Mountains, Pima County, Arizona.

Acmæodera kaupii Thom. A specimen of this rare species, not seen by Waterhouse, who studied the material for the *Biologia Centrali-Americana*, was taken by a friend of mine, Mrs. Mexia, while botanizing, January 1, 1927, near Sebastian, Sierra Madera Mountains, altitude 1800 m., Jalisco, Mexico. Both specimens are now in the collection of the California Academy of Sciences.—Edwin C. Van Dyke.

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly by the Pacific Coast Entomological Society
in co-operation with the California Academy of Sciences

E. P. VAN DUZEE, Editor.

S. B. FREEBORN., Treasurer

EDITORIAL COMMENT

Entomological work on the Pacific Coast has been, and to quite an extent still is, the pioneer work of describing the new species. This is foundation work and has to be done before synoptical, faunal and monographic work can be undertaken. In the East this work has advanced to where they are now producing most excellent faunal treatises such as the Butterfly and Moth books of Dr. W. J. Holland; Blatchley's books on the Coleoptera, Orthoptera and Hemiptera; the Connecticut books on Hymenoptera, Hemiptera and Odonata, and the New York volume on the microlepidoptera. In the West the butterflies are well covered by the beautiful books by W. G. Wright and J. A. Comstock, but our insects of other orders are still in process of description. In the work of collecting and describing the new species the California Academy of Sciences has taken a prominent place. In the pages of its three publications, the *Proceedings*, *Occasional Papers* and the *Bulletin*, there have been described seventy-six new genera and 2063 new species of insects, while in the pages of the *Pan-Pacific Entomologist* have thus far appeared the descriptions of twenty-six new genera and 312 new species. In some of the orders of insects there are still many undescribed species to be discovered in our western fauna, but we are nearing our goal where useful faunal books can be produced, when competent students with the necessary leisure can be found to do the work.

A most interesting journal letter from Mr. C. L. Fox tells of his safe arrival in England after a most delightful voyage direct from San Francisco to London by way of the Panama Canal. He was looking forward to an early resumption of his studies in the genus *Nomada*, on which he was engaged when he left San Francisco.

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THE PAN-PACIFIC ENTOMOLOGIST

Published by the
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San Francisco, California
1928

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in July, October, January and April by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Annual subscription \$2.00 in advance for the United States and Canada; \$2.25 for foreign countries. Subscriptions should be sent to the treasurer, Dr. Stanley B. Freeborn, University Farm, Davis, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

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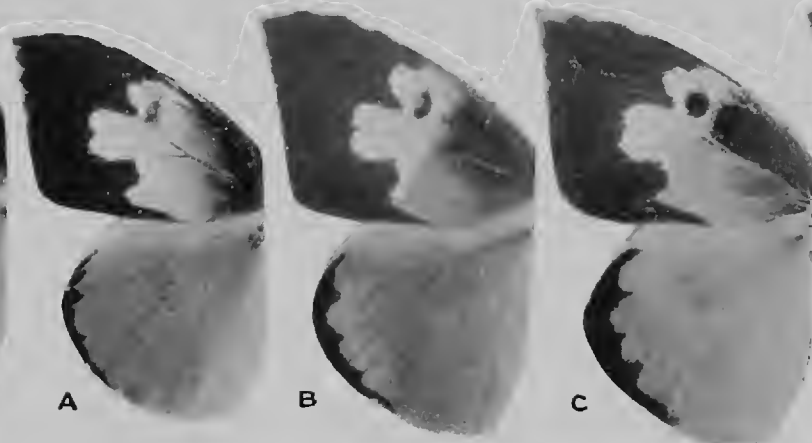
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Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.



form ♂- bernardino Edw.



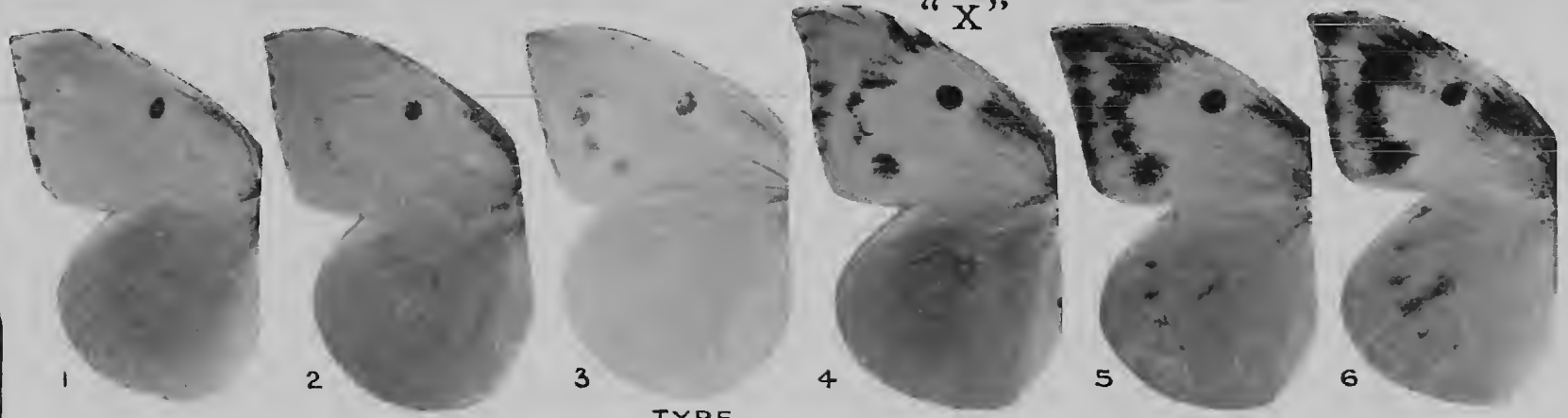
form ♂- lineainita Gun.



tr. f.- fanniae Gun.



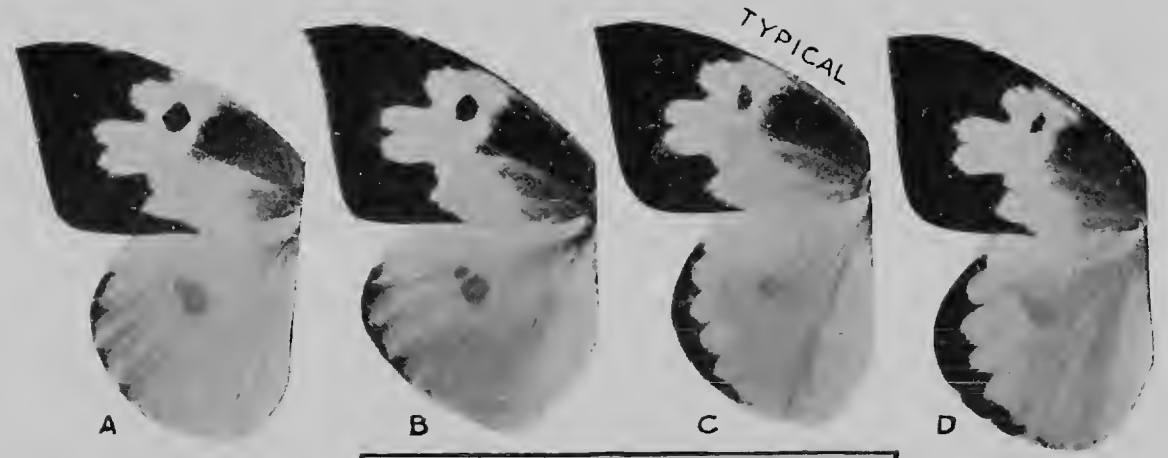
species-
Zerene eurydice Bvd.



form ♀- masumbrosus Gun.



form ♀-
immaculsecunda Gun.



species- (male)
Zerene caesonia Stoll.



species- (female)
Zerene caesonia Stoll.

The Pan-Pacific Entomologist

Vol. IV, No. 3

January, 1928

A REVIEW OF GENUS ZERENE HBN. IN THE UNITED STATES (LEPID., RHOPALOCERA)

BY J. D. GUNDER
Pasadena, California

Two valid species of the genus *Zerene* Hbn. (dog-faced butterflies) are found in the United States, north of Mexico, but not reaching Canada. The best known of the two probably is *Zerene cæsonia* Stoll which occurs plentifully in the southern states, ranging northward up the Mississippi valley and extending westward sparingly through New Mexico and Arizona into California, where it has recently established an additional habitat in the Imperial Valley. Specimens have also been taken rarely as far north as the San Francisco Bay region. The other species is *Zerene eurydice* Bdv., which is found only in California, being particularly common in the San Bernardino mountains of southern California, also occurring northward, as first reported by various early writers, as far as Mendocino County. It can be said that *eurydice* is more of a mountain butterfly, while *cæsonia* prefers the plains and low altitudes. I cannot see enough constant difference between *cæsonia* as found in eastern United States and similar specimens taken in the West to make a racial separation. It is true that *cæsonia*, as found in New Mexico and Arizona and adjacent northern states, is less broadly marked, but similar specimens may be sorted out wherever *cæsonia* flies in quantity. In some localities in the East the under side appears more ruddy (perhaps a seasonal form) and the maculation heavier; in these particulars they differ somewhat.

Entomological writers in the past have always wondered just how near *cæsonia* and *eurydice* converge, or if there is a connecting link between them. Typical male *eurydice* is of course easily told from male *cæsonia* by its brilliant reddish sheen over upper side of primaries. This superficial difference is well known and has been shown for years by Edwards, Wright and

others in their colored plates. The distinction, or rather unity as I will show (compare fig. "X" on *cæsonia* plate with similar fig. "X" on *eurydice* plate) between the females, has never been worked out and that is the primary reason for this article, for I believe it is in the forms of this sex that a common ancestor may some day be traced.

Explanation of Plate 1. *Zerene eurydice* Bdv.

The genus *Zerene* is closely related to, and probably was formerly united with, the genus *Eurymus* (Colias). Aside from neurational variance, a character peculiar to the female, and superficial differences, they are practically first cousins. The *Eurymi* undoubtedly had their origin in northern or higher altitudes. They are considered mountain butterflies because the majority of the earth's valid species are found where cooler conditions prevail. Long habitation in cooler localities tends to lighten pattern, so we find *Zerene eurydice* with the weaker maculation only in the mountains, and showing the result of an extended existence under those conditions. Its females are immaculate or rarely marked and the males generally have clear secondaries. They represent as complete a reversion to prehistoric parentage, parallel with the *Eurymi*, as time and surroundings have allowed. Kindred species from the mountains of South America also show suppression of pattern, so I believe typical *eurydice* when compared with *cæsonia* will prove to be the elder of the two species, at least as they exist on the North American continent. The mountains of southern California where *eurydice* is found are not becoming any higher or colder; in fact, according to geology, there is every evidence of the opposite trend, especially as regards climate; therefore we find *eurydice* gradually adapting itself to a warmer era, as first evinced by its forms and transition forms.

As hinted above, an increased temperature promotes design and we find female *eurydice* thus responding to the stimulus by gradually and naturally copying the wing pattern possessed by its male. This is shown on the plate by form *masumbrosus*, figs. 1 to 6. These specimens are still considered uncommon, but may be estimated at 5 per cent of a season's catch. The darker the specimens the rarer they are, which is natural because time has not allowed for the proportionate increase in numbers of

the more matured individuals. *Masumbrosus* first displays itself as a dash of black along the costal margin, starting at the base of the wing on the upper side of primaries. This will be noted by examining fig. 1 and comparing it with typical ♀ *eurydice* shown at its left. So far I can record no specimen with maculation advanced beyond fig. 6, which itself is only advanced half as far as any typical ♀ *cæsonia*. A further comparison of form *masumbrosus* also shows an entire lack of any black border markings at outer margin on secondaries, there being only a submarginal row of spots and dashes thus far produced. Time alone in the distant future will tell whether an outer margin can be added, for certainly the environmental power of the present habitat has not been sufficient to date. However, there is evidence of continued development, and it lies within the future ability of form ♂ *lineainita* to force an average of its dark-lined secondaries upon the female and thereby open up and bring development to the outer margins of *masumbrosus* which would be comparable and parallel, probably, to the ancient descending stages of female *cæsonia*. Should assistance not be forthcoming for it, then the supposition is that *masumbrosus* has the quality for diverging from the present species *eurydice* into a future species even more different than *cæsonia* has developed into.

Form ♂ *lineainita* is rare in collections; only eight or ten specimens are known to exist. Form ♂ *bernardino* has been previously listed as a race. This is entirely incorrect as no females exist for it alone. Male *bernardino* and typical male *eurydice* fly together in the San Bernardino mountains and elsewhere. It is simply a black-margined form of the male and is in no sense a race or subspecies. It is illustrated on the plate by figs. A, B, and C. Tr. f. *fanniæ* is the result primarily of a melanifusistic agency affecting the male and in turn probably the female, strengthening the dark cell areas and bringing to *eurydice* a heavy cell pattern comparable to that found in both sexes of *cæsonia*. (Note figs. A to C of form ♂ *bernardino*, comparing the sequence of their cell areas with those in both sexes of *cæsonia*). Tr. f. *newcombi* represents a premature, yet eventual, ground color change from orange, found on present *eurydice*, nearly to the yellow found on *cæsonia*; the inference

being that *eurydice* will follow the trend of *cæsonia*. All butterflies have a graduated color change from red, orange or yellow through to white, and reverse. Chromatic sequence has been mentioned in former *Entomological News* articles.

Explanation of Plate 2. *Zerene cæsonia* Stoll.

As previously stated, *cæsonia* is a low altitude or plains butterfly. It has long since left its original mountain habitat to become indigenous in a warmer environment, spreading down from the hills over the semitropical plains of both North and South America. The female has almost perfectly acquired the darker patterns of the male, probably reaching its climax of development as shown by fig. 6. With its present warmer surroundings, rarely does it produce a lighter patterned, retrogressive strain such as form ♀ *immaculsecunda* which represents a reversion to its ancestral mountain first cousin *Zerene eurydice*, form ♀ *masumbrosus*. The ♂s of *cæsonia* also become slightly atavistic as illustrated by their secondary phases from figs. A to D. I have seen no ♂s which have absolutely unmarginated secondaries. A form called *rosea* Roerber has been named which has small black stripes instead of the black marginal band on the secondaries. This is shown by fig. ♂ B and fig. ♀ 3. The illustrated specimens are from New Mexico. It has undoubtedly served the same purpose for *cæsonia*, as I have suggested above, that form ♂ *lineainita* serves for *eurydice*. The more level nature of the vast territories over which *cæsonia* has spread gives it an immense area of habitation, and its past colonization must have been fairly easy and rapid. There are millions of *cæsonia* as compared to hundreds of *eurydice* which only has its confined mountain districts to range upon.

Description of New Forms Mentioned in Above Text

Zerene eurydice Bdv. *masumbrosus*, form ♀ nov.

A sexual form occurring only among the females, having on the upper side of primaries a meager outline in black of a "dog face" of which the black spot of the cell reproduces the position of the "eye." This (male shadow) on the female follows the same style and contour as that found on the male. Extreme examples, other than the designated holotype, have a submarginal row of four or five obscure black spots on the secondaries;

occasionally a spot in this row opposite the cell may be connected with it by a dash of additional black. The under sides are as in typical ♀ *eurydice*.

Data: Holotype ♀, illustrated by actual photographic reproduction as fig. 3 on plate No. 1; from California; labeled "Eurydice ♀ var." (not in Hy. Edw.s' own handwriting) in the Hy. Edw. Coll., Am. Mus. Nat. Hist., New York.

Note: About a year ago I examined the type of *amorphæ* Hy. Edw. in his collection at the American Museum. Since then I have corresponded with Mr. Frank Watson a number of times about it and he has kindly had photos made of it for me. The type is a male and the type label is in Hy. Edwards' own handwriting on green label, which says: "Meg. eurydice, var. *amorphæ* Hy. Edw." The description of it by Hy. Edw. describes a male, but I feel that both his type and his original description represent a typical predescribed male *eurydice* Bdv. Henry Edwards thought that his one male specimen, when he described it, had a different "suffusion with richest purple," but Boisduval's prior type also has "un reflect violet changeant"; so the two are the same thing and thus *amorphæ* Hy. Edw. falls as a synonym directly under *eurydice* Bdv. William Beutenmuller, who published a list of the Edwards' types after his death, and who should know, says: "One male; Mendocino County, Calif.," for "*Colias eurydice*, var. *amorphæ* Hy. Edw.," consequently the real female specimens which have been thought to have been *amorphæ* have in reality up until the present time been without a name. So I am calling them form ♀ *masumbrosus*, meaning "male shadow," and am designating the holotype as the specimen which has lain in the Edwards' collection for years and which has been mistaken for its female, though Hy. Edwards never gave it that connection or evidently thought of describing it. I wish to thank Mr. Watson for assisting me to establish the identity of synonym *amorphæ*.

Zerene eurydice Bdv. *lineainita*, form ♂ nov.

Typical ♂ *eurydice* Bdv. has immaculate secondaries, free of any black design. Form ♂ *bernardino* Edw. has a black band at outer margin on secondaries which in some specimens is represented only by a thick line and in others by quite a broad marginal edge. This new form has no black band, but a series

of black streaks extending inward from the outer margin on each of the veins and nervules. These thin streaks are more noticeable nearer the costa where they extend inward about one-quarter the width of the wing. The under sides are as in typical ♂ *eurydice*.

Data: Holotype ♂, shown on plate No. 1; expanse, 54 mm.; San Bernardino mountains, California, July 3, 1924; in author's collection.

Zerene cæsonia Stoll, *immaculsecunda*, form ♀ nov.

Primaries: with greatly reduced black markings; outline of "dog face" not clear-cut, having outline at "forehead" incomplete. Secondaries: immaculate of all usual marginal designs, cell blotch remaining as usual. Wings beneath as in typical *cæsonia*, yet not over ruddy.

Data: Holotype ♀, shown on plate 2; expanse, 62 mm.; Pinery Canyon, Arizona (Kusche), September 23, 1927; in author's collection. One paratype ♀, shown on plate 2; expanse, 55 mm.; Willard, Missouri (Brower), September 27, 1917; in collection of Mr. A. E. Brower, Willard, Missouri.

Note: Seitz pictures what he evidently considers *helena* Reak. from Bolivia, South America. His ♀ looks something like the above-described form.

Check List Revision for United States species of Genus *Zerene* Hbn.
(See classification scale, *Entomological News*, November, 1927.)

Old Listing (By Barnes and Benjamin)	New Listing (Now proposed)
Zerene Hbn.	Zerene Hbn.
56. <i>eurydice</i> Bdv.	—. <i>eurydice</i> Bdv.
♂ <i>wosnesenskii</i> (Men.)	♂ <i>wosnesenskii</i> (Men.)
♀ <i>lorquini</i> (Bdv.)	♀ <i>lorquini</i> (Bdv.)
♀ <i>helena</i> (Reak.)	♀ <i>helena</i> (Reak.)
<i>ab. fanniæ</i> Gunder	♂ <i>amorphæ</i> (Hy. Edw.)
<i>gen. æst. amorphæ</i> (Edw.)	<i>f. ♂ bernardino</i> (Edw.)
<i>a. bernardino</i> (Edw.)	<i>f. ♂ lineainita</i> Gunder
<i>ab. newcombi</i> Gunder	<i>f. ♀ masumbrosus</i> Gunder
57. <i>cæsonia</i> (Stoll)	<i>tr. f. fanniæ</i> Gunder
* <i>caroliniana</i> (Petiver)	<i>tr. f. newcombi</i> Gunder
(pre-Linn.)	—. <i>cæsonia</i> (Stoll.)
<i>gen. autum. rosa</i> (M'Neill)	<i>f. rosæ</i> (Roeber)
<i>form rosæ</i> (Roeber)	<i>f. vern. rosa</i> (M'Neill)
	<i>f. immaculsecunda</i> Gunder

A NEW STICTIELLA FROM TEXAS (HYMENOPTERA, BEMBECIDÆ)

BY CHARLES L. FOX

*London, England**Stictiella terlinguæ* C. L. Fox, new species

In Parker's key the male runs to *megacera* and the female to *tenuicornis*, both sexes differing from these species by fasciæ on tergites broken into discal and lateral spots and many other characters, including, in the male the eighth sternite with prominent discal spine, wanting in *megacera*, and in the female the scape shorter and stouter, pubescence on clypeus and face not silvery as in *tenuicornis*. Length, 16 to 17 mm.

Male. Labrum short and broad, roundedly truncate at apex; clypeus strongly convex; prominent longitudinal carina between the antennæ; scape normal; flagellum cylindrical, long, slender, segments 2 to 4 almost equal in length, the second being a trifle the longer, 6 to 11 with inner apical angle slightly produced; ultimate segment slightly curved and somewhat flattened apically; inner margins of compound eyes almost parallel. Legs long and slender; middle femora smooth below; metatarsi normal, slender; pulvilli large and distinct. Wings hyaline, short, about two and a half times as long as the breadth of thorax; veins almost black; second cubital cell on top almost as wide as below; first cubital cross-vein slightly bent near junction with cubitus. Pubescence moderately long and sparse on head and thorax, short yet quite evident on tergites and sternites. Second sternite bearing a short pointed, median, somewhat hirsute tubercle; eighth sternite ending in three curved spines of which the central longer one has, arising from its base beneath, a prominent fourth spine, which is stout, pointed and obliquely directed backward. Genital stipites long and narrow.

Color black with the following pale yellow or yellowish white maculations: mandibles, except apices; clypeus, except minute posterior lateral spots; frons, except median butterfly-shaped spot connected laterally with black of vertex; broad anterior orbits narrowed to a point above; posterior orbits, broad below, very narrow above and reaching vertex; posterior border of pronotum and sides of prothorax except dusky line in front of tubercles; tegulæ almost entirely; lateral lines, a pair of narrow discal lines and a small posterior marginal discal spot on scutum; fascia on scutellum, narrowed medially; metanotum almost entirely; indistinct fascia on dorsum of median segment (on one paratype broad medially) and sides of same; meta-

pleuræ, mesopleuræ almost entirely, mesosternum except one medial spot in front of middle coxæ; fasciæ on tergites one to six broken with large rectangular lateral spots and a pair of ellipsoidal medial spots; apex of ultimate tergite; first sternite except lateral basal spots, second except small medial spot, continuous broad fasciæ on three to six, emarginate, more or less, medially and laterally; coxæ and trochanters in part, femora and tibiæ except stripes above, and tarsi. Scape rubescent, flagellum black above, rufous below. Dorsal marking of tergites pale yellowish white.

Female. Head, thorax and abdomen broader, and flagellum and legs stouter than in the male, but pulvilli as distinct. Anterior tarsal combs strongly developed; ultimate tergite with few coarse shallow punctures and stout spines on lateral basal borders; pubescence similar to that on male.

Color black with the following rich yellow maculations: labrum; mandibles, except apices; clypeus, except small indistinct basal lateral spots; scape; frons, except large butterfly-shaped spot on middle, connected laterally with black of vertex; broad anterior orbits; posterior orbits, broad below, gradually narrowed above, very narrowly connected across vertex; posterior discal border of pronotum, sides of prothorax; tegulæ; broad lateral lines and U-shaped discal mark on scutum; broad fascia, narrowed medially, on scutellum; metanotum almost entirely; broad curved fascia on dorsum of median segment, lateral angles and sides of same; metapleuræ; mesopleuræ almost entirely; mesosternum with small black round discal lateral spots; fasciæ on tergites one to four, broken into large rectangular lateral spots, and a pair of large ellipsoidal medial spots; fascia on tergite five sharply bisinuate on anterior border and deeply notched on posterior border; ultimate tergite, except notched anterior border; first and second sternites entirely; third, except emarginate somewhat on anterior margin; fourth and fifth bisinuate on anterior border and deeply notched on posterior border; ultimate tergite, except notched anterior border; first and second sternites entirely; third, except emarginate somewhat on anterior margin; fourth and fifth with broad fasciæ, narrowed medially; ultimate sternite, except very narrow broken longitudinal line on middorsal area connected with narrow emarginate basal margin and apex; coxæ; trochanters in part; femora and tibiæ with stripes above tarsi. Underside of flagellum yellow, changing to rufous toward the apex. Described from three males and three females.

Type, male, No. 2474, and *allotype*, female, No. 2475, Mus. Calif. Acad. Sci., collected by J. O. Martin, May 6, 1927, at Terlingua, Texas. *Paratypes* same data in collection of the California Academy of Sciences.

NOTES AND DESCRIPTIONS OF NEW SPECIES
OF LUCANIDÆ AND CERAMBYCIDÆ
(COLEOPTERA) FROM WESTERN
NORTH AMERICA

BY EDWIN C. VAN DYKE
University of California, Berkeley, California

LUCANIDÆ
Platycerus Geof.

The genus *Platycerus* is in the main Holarctic, with the bulk of its species in North America, particularly on the Pacific Coast. During recent years a number of new forms have been described from this country which careful field observations and larger series than were formerly available have shown to have unequal standings. Some are without doubt very distinct species, others geographical races or subspecies, while many are nothing more than mere individual variations or even absolute synonyms. I am now convinced that there are not more than nine good species, even including the one which I will add. The following table, descriptions and notes will, I hope, show this.

SYNOPTIC KEY

- 1. Antennal club composed of four unilaterally dilated segments, males with larger heads and much larger mandibles than females 2
- Antennal club composed of but three unilaterally dilated segments, males with mandibles hardly larger than those of females 4
- 2. Seventh antennal segment of male almost as large as eighth, mandibles of males with large tubercle on outer side near base, the sides almost straight and convergent, with numerous teeth on inner face near apex, color black or with but a faint bronzing of the elytra.....*depressus* Lec.
- Seventh antennal segment of male much smaller than eighth, mandibles of males ending in three cusps and without teeth on inner edge near apex, upper surface somewhat bluish, greenish or bronzed 3
- 3. Male mandibles obliquely sinuate on outer margin, head and pronotum rather closely punctured, pronotum without longitudinal impression at middle, lateral margins quite wide, color of upper surface variable, bluish, greenish or bronzed.....
.....*quercus* Web.
- Male mandibles to a great extent arcuate on outer margin, head and pronotum not closely punctured, pronotum with

- evident longitudinal impression at middle, lateral margins rather narrow, species normally much larger than preceding, head and pronotum black, faintly bronzed at most, elytra blue or somewhat greenish.....*oregonensis* Westw.
4. Males more elongate, parallel and less convex than females, club of antennæ as long or longer than funicle, middle and hind tibiæ long and narrow, armed with but few sharp teeth..... 5
- Males robust like females, club of antennæ shorter than funicle, middle and hind tibiæ very robust and heavily armed with series of short spines..... 9
5. Species either rufous or somewhat piceous and generally with a pronounced bronze luster, elytra with definitely impressed striæ or striate arrangement of punctures..... 6
- Species piceous or black and with the faintest trace of bronzing at most, elytra with striæ not clearly defined..... 8
6. Sides of prothorax sinuate behind and hind angles right-angled, genæ hardly more prominent than eyes, prothorax with lateral margin of moderate width, disk closely punctured, especially at sides, elytra with striæ always well impressed, color rufopiceous with marked bronze luster.....*agassizi* Lec.
- Sides of prothorax oblique or hardly sinuate behind, with hind angles obtuse; lateral margins broad, disk not very closely punctured even at sides..... 7
7. Upper surface with a definite æneous luster, genæ not more prominent than eyes, anterior margin of prothorax slightly emarginate; stria punctures of elytra more prominent than interstitial, disk quite convex even in males.....*æneus* sp. nov.
- Upper surface rufocastaneous on rufopiceous (females), without marked bronze luster, genæ decidedly more prominent than eyes, head in front of eyes wedge-shaped, anterior margin of prothorax rather deeply emarginate, stria punctures of elytra not more prominent than interstitial, the elytral punctuation thus somewhat confused, males quite flat and with very broad margins to prothorax.....*laticollis* Casey
8. Sides of prothorax broadly, rather evenly arcuate, strongly sinuate behind, with hind angles right or acute, side margin decidedly reflexed; head and pronotum coarsely, closely punctured, pronotum less closely in females; elytra coarsely and quite irregularly punctured, the stria and interstitial punctuation not readily separable; color piceous.....*latus* Fall
- Sides of prothorax in front oblique, divergent behind and hardly arcuate to well behind middle, then broadly rounded and sinuate to hind angles which are right or acute; head coarsely, closely punctured, pronotum more finely; elytra very finely, irregularly and not closely, especially in females; stria arrangement of punctures only evident here and there; color dull black.....*opacus* Fall

9. Sides of prothorax broadly rounded at middle, oblique in front and behind or the latter slightly sinuate, with hind angles obtuse, side margin very narrow; elytra with strial arrangement well indicated, the alternate intervals slightly elevated, punctures rather numerous and but moderately coarse, color rufopiceous or piceous and not bronzed.....*keeni* Casey

PLATYCERUS DEPRESSUS Lec.

This is the most northern of our species and the one with the greatest longitudinal range. The western phase lives in old rotting aspen logs, *Populus tremuloides* Michx. The typical form, black with somewhat bronzed elytra, extends from Nova Scotia and northern New England to the Lake Superior region. The subspecies *marginalis* Casey, black without bronze luster, larger, broader, with the elytral striæ finer and the punctuation less deep than the other, ranges throughout the entire Rocky mountain region including the Wasatch Mountains of Utah and the high Cascade and Sierra Nevada mountains. A second subspecies which I will now describe has recently been found.

Platycerus depressus cribripennis Van Dyke
new subspecies

Dull black, almost subopaque. Head broad in male, coarsely, deeply punctured, genæ prominent, subangulate at apex, with narrow margins; male mandibles with the outer basal tooth acute and upturned. Prothorax in general similar to typical form and *marginalis* but with hind angles sharply rectangular and lateral margins narrow. Elytra with humeral tooth lacking and the surface coarsely, deeply, closely, and cribrately punctured, with neither striæ nor intervals defined. Male, length 12.5 mm., breadth 4.5 mm.; female, length 12 mm., breadth 5 mm.

The females as usual have smaller heads and narrower prothorax than the males, with more closely punctured heads and slightly broader elytra.

Holotype, male, No. 2533, and *allotype*, No. 2534, Mus. Calif. Acad. Sci., and one *paratype* in the Slevin collection of the California Academy of Sciences. All three specimens were collected by Mr. L. S. Slevin at Tassajara, Monterey County, California, the holotype, May 25, the others May 21, 1920. The male was found on an alder log.

This insect is so distinct superficially because of its subopaqueness, coarse and cribrate type of elytral punctuation, narrower thoracic margins, and other minor features, that one

would almost be justified in considering it a good species. It, however, possesses the characteristic facies and fundamental characters which are so distinctive of *depressus* and its closer subspecies *marginalis*. In view of this, and knowing how greatly the various races of other Lucanidæ vary as to surface sculpturing, I feel that it is better to place it as a subspecies.

PLATYCERUS QUERCUS Web.

A widely distributed species throughout the region east of the Mississippi River and quite variable, especially as to color. The so-called varieties *angustus* Casey and *iowanus* Casey are so poorly defined that I think them hardly worth recognizing. They should be placed with *securidens* Say and ? *virescens* (Fab.) as synonyms.

PLATYCERUS OREGONENSIS Westw.

This is in many ways but a larger relative of *quercus*, replacing it on the Pacific Coast where it is widely distributed from British Columbia to southern California. The typical form with a distinctive bluish color breeds in the rotting trunks of a number of our softwood trees such as alder and California laurel, *Umbellularia californica* Nutt. and the introduced Australian blue gum, *Eucalyptus globulus* Labill., and like most of its larger relatives varies greatly in size and shape. Along the sea beaches of the Oregon coast there is a phase which generally lacks the bluish color, being as a rule black with a slight greenish luster. The mandibles of the males also appear to be more horizontal, less elevated at the apex, than in typical forms. It, however, gradually grades into the typical form. *Cærulescens* Lec. and *chalybæus* Casey are absolute synonyms.

PLATYCERUS AGASSIZI Lec.

This is a coastal species ranging from just south of San Francisco to middle Oregon. It breeds in several species of oak, madrone, *Arbutus menzesii* Pursh., and so forth, and varies in appearance slightly as regards the males and greatly as regards the females, some of the latter being twice normal size and much more rugose. In the northern part of its range, subspecies replace the typical form. The most frequent of these is *pacificus* Casey of which *californicus* Casey is the female and *peregrinus* Casey, a synonym, a very weak race differing as

regards the male in being somewhat smoother and the female less rugose, with the elytra more distinctly striate. The subspecies *parvicollis* Casey is a fairly distinct subspecies, at least as regards the male which is evidently narrower and more elongate than typical *agassizi* and, as indicated by its name, with a smaller prothorax. *Pacificus* ranges from northern Mendocino County, California, to about Coos Bay, Oregon, while *parvicollis* seems to be limited to Humboldt Bay, California.

Platycerus æneus Van Dyke, new species

Elongate, elliptical, moderately convex, shining, rufopiceous with a pronounced æneous luster, the legs quite rufous. Head with front flattened, coarsely, irregularly and rather closely punctured, with a few semierect hairs, and the usual smooth oblique ridges in front of the eyes; clypeus slightly emarginate in front and depressed, sides oblique, galea lobed and hardly more prominent than eyes; mandibles but moderately prominent, with a blunt tooth near middle of inner margin; antennæ with segments 3 to 7 slightly but gradually increasing in breadth, 8 to 10 broadly unilaterally dilated forming the usual loose club which is slightly longer than funicle, 8 to 9 twice as broad as long, the tenth somewhat pentagonal. Prothorax 1.5 mm. broader than long; sides broadest slightly behind middle, a bit arcuate in front, oblique and but faintly sinuately convergent to obtuse hind angles; base just perceptibly arcuate; side margins broad and considerably reflexed; disk rather coarsely, irregularly and somewhat closely punctured, especially at sides, a longitudinal smooth area at middle, with a faintly impressed line posteriorly. Elytra not quite a third longer than broad, with humeri well rounded, vaguely dentate at most, the sides slightly widened to beyond middle then evenly arcuate to apical angles, the margins quite broad and reflexed, especially posteriorly; disk with striæ finely impressed, in most places indicated only by the moderate-sized, rather closely placed punctures; intervals flattened and irregularly punctured with well-spaced punctures. Beneath rather coarsely, regularly and quite closely punctured. Legs long and delicate, front tibiæ distinctly serrate outwardly as usual, middle and hind tibiæ slender, the tarsi long, about equal in length to tibiæ. Length 10 mm., breadth 4.25 mm.

Female generally shorter, broader, more convex and generally robust, more rufous, with æneous luster less pronounced. Head smaller, sides in front more evenly arcuate, mandibles smaller; antennæ shorter, the club smaller and not longer than funicle. Prothorax longer and narrower, with sides quite broadly and evenly arcuate, side margins narrower, the disk more convex. Elytra elliptical, quite convex, the striae punctation more regular and the punctation of intervals finer and sparser. Legs shorter and stouter as

usual, the femora and tibiæ especially so. Length 9.5 mm., breadth 4.5 mm.

Holotype, male, No. 2535, and *allotype*, female, No. 2536, Mus. Calif. Acad. Sci., and several designated *paratypes* from a series of nine specimens collected by myself at Cannon Beach, Clatsop County, Oregon, during June, 1927; the holotype, June 18, the allotype, June 9. Other specimens studied in the collection of the California Academy of Sciences are: two females from Forks, Clallam Co., Wash., collected by Mrs. Helen Van Duzee, July 1, 1920; two males from Hoquiam, Wash., May 27, 1914, and two males from Humptulips, Wash., May 28 and 29, 1914, collected by myself; as well as one male from Tillamook, Ore., July 5-6, 1911, collected by Mr. J. R. Slevin. These are all from the extreme coastal or wet belt of western Washington and northwestern Oregon.

This species is a very distinct one, belonging in the *agassizi* group, in some ways like *Platycerus agassizi* Lec. itself, in other respects more like *laticollis* Casey. From the former and more southern species *æneus* differs by being slightly smaller and shorter, the surface smoother and more shining with an æneous or greenish bronze luster much like that of the cerambycid, *Phymatodes æneus* Lec., the upper surface not so coarsely nor so densely punctured, the elytral intervals never elevated or convex as they are in *agassizi*; the antennal club less developed; the prothorax not so long, the sides not markedly sinuate posteriorly and with hind angles sharply right-angled as in *agassizi*, but the sides oblique and hind angles obtuse with the side margins broader and more broadly reflexed. *Platycerus laticollis* Casey differs from *æneus* by being flatter, with very much broader and flatter elytral margins, by having a heavier antennal club, genæ more prominent than eyes and by being much more rufous and lacking the evident æneous luster.

PLATYCERUS LATICOLLIS Casey

Like *æneus* a well-marked species. It is apparently limited to the coastal mountains west of Corvallis, Oregon, and extends along the coast from Marshfield (Coos Bay) to Newport.

PLATYCERUS LATUS Fall and PLATYCERUS OPACUS Fall

These are two very distinct species, undoubtedly offshoots of the *agassizi* stock and like it having the prothorax very sinuate

behind and with right or acute hind angles. The former is confined to the foothills of the middle Sierra Nevada, Placer and El Dorado counties, and the latter to the more southern Sierra, Tulare and Fresno counties.

PLATYCERUS KEENI Casey

This was described from specimens found on the northern Queen Charlotte Islands, and *Platycerus thoracicus* Casey, from specimens taken on Humboldt Bay, California. Typical specimens of the latter, I have studied from the type locality and I have also taken a good series from Waldport and Cannon Beach, Oregon. The larger specimens of this species, for it may be 12 mm. or over in length and very robust, might be separated from *keeni* by their size and robustness, but the smaller specimens, when carefully compared with typical *keeni* from the type lot, absolutely cannot be separated either by size, appearance or by any character. I am, therefore, reducing the name *thoracicus* Casey to synonymy. *Pedicellaris* Moll. is, of course, also a synonym. *Keeni*, which shows its ancestral connection with *æneus* and *laticollis* by its obtuse prothoracic angles, is one of the most peculiar and distinct in our fauna, being provided with heavy fossorial legs, differs hardly at all as between the sexes, and is confined to the sea-coast sand dunes where it breeds in the old alder and poplar logs which have been cast up by the storms. It has not yet been taken on the Washington nor on the Vancouver Island coast, but no doubt will be.

CERAMBYCIDÆ

Callidium pallidum Van Dyke, new species

Moderately large, robust, broad, rufotestaceous, elytra somewhat lighter; sparsely clothed with long erect pile, the elytra excepted, but for a few hairs at base. Head two-thirds breadth of prothorax, coarsely, closely and shallowly punctured, triangulately sulcate between antennæ; clypeus deeply, triangularly impressed; eyes distinctly smaller than in *antennatum*; antennæ robust, almost reaching apex of elytra, basal segment robust and strongly clavate, 2 to 4 definitely enlarged apically, second about one and a half times as long as wide, third slightly more than three times as long as broad and twice length of second. Prothorax more than one-third broader than long and one-fourth shorter than base of elytra, broadest well in front of middle; sides broadly arcuate in front, oblique and convergent behind; disk somewhat flattened above, without the amphora-like depression seen in *antennatum*, punctured like head, the base

deeply and completely margined. Elytra twice as long as broad, broadest back of humeri, narrowed apically, humeri prominent; sides slightly arcuate in front, thence broadly slightly emarginate to rounded apices; disk much flattened, coarsely, rather deeply and irregularly reticulate, two distinct and elevated longitudinal lines in paratype but not in holotype. Abdomen beneath finely, sparsely punctured, with well-marked impressions near margins of each segment, the pubescence finer and less erect than anteriorly. Legs very markedly and suddenly clavate, the dilated portions expanded transversely as well as laterally. Length 11 mm., breadth 4.5 mm.; paratype, length 14 mm., breadth 6 mm.

Holotype, No. 2537, Mus. Calif. Acad. Sci., collected by Mr. L. S. Slevin at Arbolado (mouth of Big Sur River), California, May 13, 1913, and one *paratype* from La Honda, southern San Mateo County, California, taken from California redwood, *Sequoia sempervirens* Endl., on December 15, 1922, by a Mr. Gladstone, and donated to the California Academy of Sciences by Dr. H. E. Burke.

This light-colored and very robust species I have long known through the holotype which was submitted to me some years ago by Mr. Slevin. At first it was believed to be immature, and it was not until I saw the second specimen that I realized my mistake. It is readily separated from all of our larger species by its color, robustness, hairiness, the robust antennæ with basal segments all slightly clavate, the decidedly clavate legs and the cribrate elytra.

***Callidium hardyi* Van Dyke, new species**

Narrow, elongate, subparallel, black, slightly shining, punctate rugose and clothed with a short, fine suberect cinereous pile. Head three-eighths breadth of prothorax, eyes hardly projecting beyond the parallel sides, occiput moderately coarsely and closely punctured, clypeus deeply triangularly impressed; antennæ reaching to last quarter of elytra, basal segment clavate, second small, third about five times as long as broad, the following gradually shorter and broader. Prothorax considerably narrower than base of elytra, almost quadrate, as long as broad, sides barely arcuate and narrowed behind, disk slightly convex and closely, rather coarsely punctured, with three small somewhat triangularly disposed callosities. Elytra almost three times as long as broad, sides straight, almost parallel, disk flattened, very coarsely, closely punctured and somewhat transversely rugose. Beneath rather coarsely, shallowly punctured in front, finely and sparsely on abdomen. Length 8.5 mm., breadth 2.5 mm.

Holotype, No. 2538, Mus. Calif. Acad. Sci., and four *paratypes*, taken from Douglas fir, *Pseudotsuga taxifolia* Britt. at

Garden Head, British Columbia, one of the paratypes, April 12, 1897, the others May 30, 1927. They were collected by Mr. George A. Hardy of the Provincial Museum of Natural History at Victoria, British Columbia, after whom I take great pleasure in naming it. One of the specimens differs by having the prothorax reddish yellow except for a discal and sternal black spot, and the bases of the front femora also reddish yellow.

This species has for some time been confused with *Callidium vile* Lec. which it greatly resembles and which likewise breeds in the Douglas fir, but it is very much larger, one-third longer, with eyes slightly more prominent and head more exposed (the head in *vile* generally greatly retracted); the antennæ much longer and narrower (in *vile* about reaching middle of elytra and with third segment never longer than four times breadth, the following also shorter than is the case in *hardyi*), the prothorax longer and narrower (in *vile* broader than long and almost equal in breadth to base of elytra), and the elytra having a well-defined punctuation, whereas this is to a great extent obliterated by the running together of the pits with a greater development of rugoseness in the other. This species might possibly be confused with the black phase of *Callidium hirtellum* Lec., but this latter is restricted to pines, is shorter and broader, more densely pilose, with a different type of antennæ, and otherwise is quite diverse.

MELANOPHILA CONSPUTA Lec.

This well-known buprestid is attracted in great numbers not only to recently scorched forest trees and to the neighborhood of lumber mills where there is burning slash and sawdust, but to burning petroleum (see Pan-Pac. Ent. III, 1926, p. 41), and sugar mills. During the hot days preceding October 12, 1927, great numbers of these were observed about the Western Sugar Refinery in San Francisco. They seemed to congregate about the vats and other places where the hot sugar or syrup was. The authorities of this plant tell me that this is of frequent occurrence during the hot spells of late summer and autumn.—Edwin C. Van Dyke.

A SHORT REVIEW OF THE TRIBES ORSODACNINI
AND CRIOCERINI OF THE COLEOPTEROUS
FAMILY CHRYSOMELIDÆ WITH SPE-
CIAL REFERENCE TO SPECIES OF
WESTERN UNITED STATES

BY HAROLD R. BRISLEY

(Continued from page 60)

Genus ZEUGOPHORA Kunze

The genus is sufficiently characterized in the key to enable it to be distinguished from other genera in the tribe. It is composed of seven North American species, five of which occur west of the Rocky Mountains.

KEY TO THE WESTERN SPECIES OF THE GENUS
ZEUGOPHORA KUNZE

- A. Body above entirely black.....1. *abnormis* Lec.
AA. Body above entirely testaceous or bicolored.
B. Elytra black; prothorax orange.
C. Lateral margins of prothorax above the tubercles
narrowing slightly to apical angles.....
2. *scutellaris* Suffr.
CC. Lateral margins of prothorax above the tubercles
straight to apical angles.....3. *neomexicana* Schffr.
BB. Elytra testaceous or bicolored.
D. Prothorax entirely orange; at least the basal half of
the sutural margin of elytra black.....
4. *californica* Cr.
DD. Prothorax bicolored or entirely testaceous; at least
the basal half of the sutural margin of the elytra
yellow.....5. *varians* Cr.

ZEUGOPHORA ABNORMIS (Lec.)

This species needs no further characterization than that given in the key. It is the only species of the genus with the body, above and below, black. Specimens have been taken from near Lake Superior, New Mexico, Colorado, Washington, and California.

ZEUGOPHORA VARIANS Cr.

Elongate-oblong, subconvex. Top of head and disk of prothorax reddish yellow to black, the latter usually with a yellow median stripe which widens on basal half; elytra usually piceous with a long oval or heart-shaped yellowish spot on center of disk; front of head, antennæ, legs and prosternum dull reddish

yellow. Prothorax with an obtuse lateral spine; entire body sparingly pubescent. Length, 3 mm.

The color as given above is subject to great variation. Specimens occur which are entirely ferruginous and without trace of black. When the prothoracic disk is black it is often divided in half by a yellow median line. The testaceous and ferruginous individuals are more common in western collections than the typical *Z. varians*, which is largely black.

Specimens have been taken in Pennsylvania, Massachusetts, Michigan, Illinois, Indiana, Washington, and California. They are generally taken from the foliage of poplar.

ZEUGOPHORA SCUTELLARIS Suffr.

This species may be distinguished from all others of the genus, with the exception of *Z. neomexicana*, by the color of the elytra as given in the key. It closely resembles the recently described *Z. neomexicana* Schffr. It can, however, be separated from that species by its shorter length and by the oblique lateral margins of the prothorax above the tubercles, which in *Z. neomexicana* is straight to the apical angles.

Specimens have been taken in Illinois, Indiana, Michigan, New Mexico, Washington, and Oregon. They are quite rare in collections.

ZEUGOPHORA NEOMEXICANA Schffr.

This species was described in 1919 from Santa Fé, New Mexico. According to its author it differs from *Z. scutellaris* by being a little longer, and by the lateral margin of the prothorax above the tubercles being straight to the apical angles, instead of oblique. *Z. neomexicana* can readily be distinguished from the other members of the genus by the black elytra and orange prothorax.

ZEUGOPHORA CALIFORNICA Cr.

This species is quite rare in collections. It may be distinguished from *Z. varians* by the color characters given in the key. From *Z. scutellaris* and *Z. neomexicana* it is clearly separated by the testaceous or bicolored elytra. It inhabits Oregon and California, and is generally taken from the foliage of willow.

Tribe CRIOCERINI

LeConte and Horn in 1883⁷ state that the distinction between this and the tribe Orsodacnini is feeble and based only on the greater length of the first ventral segment and the different shape of the claws. The facies of the species composing these two tribes are to my notion quite distinct, the difficulty lies in finding definite divisional characters. To the characters mentioned by the above named authors can also be added the deep V-shaped groove of the vertex. This is entirely absent in the preceding tribe, but is pronounced in all the species of Criocerini which I have examined.

This tribe has been much neglected by systematic workers, probably because more than half the species are extremely rare in collections. The only attempt at a revision of the North American species was made by G. R. Crotch in 1873.⁸ In this paper he covers only twelve species of the genus *Lema*. Since the date of his paper there have been fourteen additional species described, most of which inhabit western United States.

The tribe is composed of only two genera, both of which are represented by species in western United States. To the single point given by LeConte and Horn for separation of the genera, I have added the character which appears in the key concerning the shape of the tarsal claws. In both genera the claws are of the divergent type, but in the genus *Crioceris* they are contiguous nearly at the base (Fig. 5), while in the genus *Lema* they touch for at least a third of their length (Fig. 4).

KEY TO THE GENERA OF THE TRIBE CRIOCERINI

- A. Prothorax constricted at middle; tarsal claws contiguous for at least the basal third (Fig. 4).....2. *Lema* Fab.
 AA. Prothorax cylindrical; tarsal claws separated and contiguous for less than basal third (Fig. 5).....1. *Crioceris* Geoff.

Genus CRIOCERIS Geoff.

To this genus belongs two species, both of which feed on asparagus. The true asparagus beetle *C. asparagi* (L) occurs in California. *C. duodecimpunctata* (L) has never been taken in western United States.

⁷ "Classification of the Coleoptera of North America." Smith. Misc. Coll., Vol. 26, 1883.

⁸ Proc. Acad. Nat. Sci. Phila., Vol. 25, 1873, pp. 19-83.

CRIOCERIS ASPARAGI (L)

Body elongate; head, under surface of body, femora, elytral unboned and a wide sutural stripe on the elytra, which widens at the middle and sometimes at the base, bluish-green; prothorax and elytra varying from yellow to reddish, the prothorax often with two bluish or greenish spots on the disk; antennæ from the fifth segment outward black. Length, 7 mm.

Genus LEMA Fabr.

The California Academy of Sciences has probably as great a number of species of the genus *Lema* as any single collection in the country. The following table to the western species of the genus, founded upon that collection, should prove valuable, as there is no adequate guide to the species in the literature at this time. The table is based on color, which is the best divisional character available. It will be found to be accurate, at least as regards typical species, and for any variation from the typical either noted in literature or evinced by the series which I have examined.

KEY TO THE WESTERN SPECIES OF THE GENUS
LEMA Fabr.

- A. Elytra with the ninth stria interrupted.
 - B. Antennæ and legs pale.....*æmula* Horn
 - BB. Antennæ and legs piceous or black.....*sexpunctata* Oliv.
- AA. Elytra with the ninth stria entire.
 - C. Elytra unicolorus.
 - D. Prothorax black.
 - E. Sides of prothorax broadly rounded in front of the abrupt prothoracic constriction.....*peninsulæ* Cr.
 - EE. Sides of prothorax not broadly rounded; prothoracic constriction less abrupt.....*concolor* Lec.
 - DD. Prothorax red.
 - F. Abdomen red.
 - G. First segment of antennæ and scutellum red.....
arizonæ Schffr.
 - GG. First segment of antennæ and scutellum black.....
cornuta Lac.
 - FF. Abdomen black.
 - H. Head red.....*coloradensis* Linnell
 - HH. Head, at least in part, black.
 - I. Scutellum elongate, subtriangular, with apex rounded; elytra two and one-half times as long as broad.
longipennis Linnell

- II. Scutellum semi-oval, truncate at apex, elytra not more than twice as long as broad.....
collaris Say
- CC. Elytra bicolored.
- J. Elytra blue, with transverse band at middle yellow or red.
balteata Lec.
- JJ. Elytra without transverse yellow band at middle.
- K. Elytral disk without vitta, the sutural interval alone being black.....
flavida Horn
- KK. Elytral disk at least in part black.
- L. Submarginal vitta between the sixth and eighth rows of punctures.....
notativentris Schffr.
- LL. Submarginal vitta touching the tenth row of punctures (in *confusa* this vitta is sometimes exaggerated in width so as to cover the disk of the elytra, excepting the basal fourth).
- M. Submarginal vitta abbreviated at apex and base.
confusa Chev.
- MM. Submarginal vitta reaching the base.....
trilineata Oliv., sub sp. *nigrovittata* Guer.

***Lema trilineata nigrovittata* Guer.**

For several years there has been a doubt in my mind as to the validity of the two species *L. trilineata* and *L. nigrovittata*. After a thorough study of a large series of these two species, collected not only in the eastern United States (the typical locality of *L. trilineata*) and California (the typical locality of *L. nigrovittata*, but also through Arizona and Utah, where the two species as described intermingle, I am convinced that

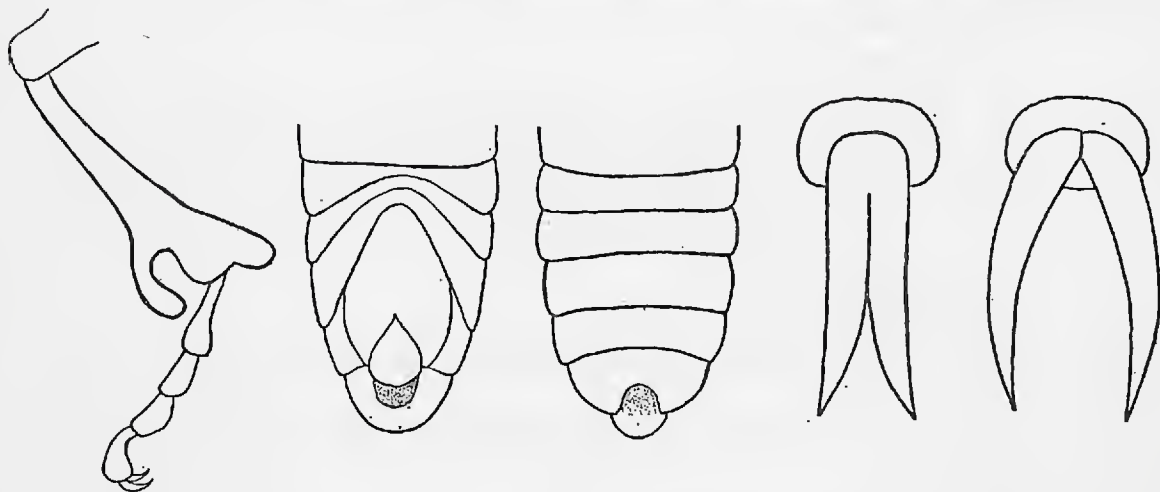


Fig 1

Fig 2

Fig 3

Fig. 4

Fig 5

- Fig. 1. *Syneta hamata* Horn male, posterior tibia;
 Fig. 2. *Tricolema anomala* Cr. male, ventral abdominal segments;
 Fig. 3. *Tricolema anomala* Cr. female, ventral abdominal segments;
 Fig. 4. *Lema trilineata* Oliv., tarsal claws;
 Fig. 5. *Crioceris asparagi* (L), tarsal claws.

L. nigrovittata should be reduced to a subspecies of *L. trilineata*. Color is the only character which serves to separate the typical forms. In a series of 100 specimens I find that 20 per cent have the typical color of *L. trilineata*, 23 per cent the typical color of *L. nigrovittata* and 57 per cent come intermediate between the two. Typical *L. trilineata* extends west into the desert regions of Arizona and California. Typical *L. nigrovittata* is found only in California, and the intermediates are mainly distributed in the regions of Arizona and California where the typical localities overlap. This conclusion is decidedly strengthened by the observation that Jimson weed (*Datura*) is the native breeding plant for both species.

CONCERNING KIRKALDY'S *NOTONECTA*
MEXICANA VARIETIES *HADES*
AND *CERES*
(Hemiptera-Notonectidæ)

BY H. B. HUNGERFORD
University of Kansas, Lawrence, Kansas

In a paper¹ published two or three years ago I reported that in Kirkaldy's collection all of his *Notonecta mexicana* var. *hades* are males and all of his variety *ceres* are females. The typical specimens of the variety *hades* are nearly black and the *ceres* always with scutellum and membrane of hemelytra black and other parts of wing red, or some lighter color grading to horn. The anterior lateral margins of the prothorax in the *ceres* are much flattened and explanate, which is not true for the *hades* forms. This fact when coupled with the very different color pattern of the two would make one hesitate to consider them a single species. However, through the kind assistance of my friend, Mr. R. A. Stirton, a former Kansas University man, I am able to settle the question definitely. Mr. Stirton has made two trips² into Central America on biological survey work and, while all of his time was concerned with the strenuous demands of his duties in connection with the collection of vertebrate forms, he managed to remember me and each time captured in passing a few aquatics. When he returned from his

¹ "Canadian Entomologist," Vol. LVII, p. 238.

² Donald R. Dickey Expedition, July, 1925, to May, 1926, inclusive, and November, 1926, to July, 1927, inclusive.

first trip he brought me three specimens of a back-swimmer, one black male and two red and black females. These specimens were Kirkaldy's *Notonecta mexicana* var. *hades* and *ceres*, respectively. I therefore asked him as a special favor to collect mating pairs, if he should have the good fortune to collect in the region again. As a result I have before me five pairs of these forms taken in copula by Mr. Stirton and in addition eleven other adult specimens and four nymphs. The data are as follows: From San Jose del Sacare, Dept. Chalatenango El Salvador, C. A., March 13, 1927, altitude 3600 feet, by R. A. Stirton; three pairs in copula and six males and one female. From the same place, but on March 11, one pair in copula and a male. From Los Esesmites, Dept. Chalatenango, El Salvador, C. A., March 1, 1927, altitude 7000 feet, by R. A. Stirton; one pair in copula and three females and four nymphs.

The males in every case are typical *hades* and the females *ceres*. In the last-mentioned pair the female has the horn color in place of the red, which is a common enough occurrence among the *N. mexicana* series. The name *hades* is a synonym of *ceres*. The species appears to be the commonest back-swimmer in Costa Rica, and I have specimens from Mexico, Guatemala, and Panama. I have seen no specimens from the United States, and believe the *Notonecta lobata* described by me from the Southwest has been mistaken for it.

ON THE DISTRIBUTION OF PERIZOMA OSCULATA
HULST (LEPID., GEOMETRIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

PERIZOMA OSCULATA Hlst.

1896, Hulst, Trans. Am. Ent. Soc., XXIII, 281, *Euchoria*.

This species was described from "Southern California." There is an example in the Barnes collection bearing a printed label "So. California. Collected by H. K. Morrison."

Three other examples have been received from the Oberthür collection. All bear hand-written data, two being labeled "Montana Morrison 1881," and the other, "Washington Territory" in what appears to be Morrison's handwriting.

The correct locality for this species would appear to be questionable.

BEEES BELONGING TO THE FAMILY BREMIDÆ
TAKEN IN WESTERN OREGON,
WITH NOTES

BY H. A. SCULLEN

(Continued from page 76)

18. BREMUS FRIGIDUS (Smith)

Smith, 1854, p. 399, ♀, ♂, Hudson Bay (see Meade-Waldo, 1916, p. 469). (Redescribed: Franklin, 1912, p. 360.)

Frison, 1926, p. 135.

Range: Canada to New Mexico.

B. frigidus is rare throughout the entire United States. Only two specimens have been taken in Oregon. It appears to be confined in Oregon to the mountain regions in the western part of the state.

Grave Creek (Josephine County), ♀, VI-30, 1925 (H. A. S.), Oregon (Josephine County), ♀, VII-5, 1925 (H. A. S.).

19. BREMUS FLAVIFRONS (Cresson)

Cresson, 1863, p. 105, ♀, ♂, ♂, Fort Yukon, Alaska, Hudson Bay Territory, Kansas ("The latter is probably erroneous" Lutz and Cockerell, 1920, p. 515). (Redescribed: Franklin, 1913, p. 368.)

Frison, 1926, p. 135.

Range: Alaska to New Mexico and east to Colorado.

This species appears to be rare in Oregon and is possibly limited to the Coast Range and the lower altitudes in the Cascades. Only males have been taken in the state, with the exception of the one queen taken at Forest Grove by A. C. Burrill, May 21, 1919 (Frison, 1921, p. 146).

Alsea Mountain, ♂, VII-20, 1921 (H. A. S.); ♂, VIII-2, 1921 (H. A. S.). Bellfountain, ♂, VII-13, 1924 (H. A. S.); Cascadia, ♂, VIII-8, 1924 (H. A. S.).

20. BREMUS FLAVIFRONS var. AMBIGUUS (Franklin)

Franklin, 1911, p. 159, ♀, ♀, Sisson and Santa Cruz Mountains, California, Keyport, Washington. (Redescribed: Franklin, 1912, p. 376.)

Frison, 1926, p. 135.

Range: Washington, Oregon, and California.

Franklin (1912, p. 194), lists this variety for Oregon. He apparently assumed it was in Oregon, since it had been taken in both Washington and California. The only records from the state are those given below. This variety seems to be very rare.

Hugo, ♀, VII-1, 1925 (H. A. S.). Three Sisters region; Fingerboard Prairie (elevation 3825 feet), ♀, VIII-14, 1926 (H. A. S.).

21. *BREMUS FLAVIFRONS* var. *DIMIDIATUS* (Ashmead)

Ashmead, 1902, p. 129, ♀, ♂, Fox Point and Wrangell (Wickham), Alaska. (Redescribed: Franklin, 1912, p. 370.)

Frison, 1926, p. 135.

Range: Alaska to Oregon.

-This species has been taken in both the Coast and Cascade Mountains. It appears to be rare in the state.

Alsea, ♀, VI-4, 1921 (H. A. S.); ♂, VIII-2, 1921 (H. A. S.). Belknap Springs, ♂, VIII-10, 1925 (G. R. McG.). McKenzie Bridge (elevation 1329 feet), ♀, VIII-27, 1924 (H. A. S.). Sexton Mountain (Josephine County, elevation 2046 feet), ♂, VI-30, 1925 (H. A. S.). Three Sisters region; Frog Camp (elevation 4700 feet), ♀, VIII-15, 1926 (H. A. S.). Wahtum Lake (Mount Hood region, elevation 3700 feet), ♀, VIII-24, 1923 (H. A. S.).

22. *BREMUS CENTRALIS* (Cresson)

Cresson, 1864, p. 41, ♀, Fort Creek, California (Ulke); 1879, p. 231, Colorado.

The only record of this species from western Oregon is a male taken by M. M. Rheer at Wilson (Tillamook County), August 7, 1916, and a worker taken at Crater Lake, July 19 (Frison, 1927, p. 371).

23. *BREMUS APPOSITUS* (Cresson)

Cresson, 1878, p. 183, ♀, ♂, Colorado, New Mexico, Utah, Nevada. (Redescribed: Franklin, 1912, p. 285.)

Franklin, 1913, p. 288; Frison, 1927, p. 372, Crater Lake, Mount Hood.

Range: East to South Dakota (Frison, 1926, p. 136), and from British Columbia south to the Mexican border.

Occurs throughout western Oregon from 174 feet to about 4650 feet. Common in the Willamette Valley. Less common along the coast.

Albany, ♀, VII-8, 1921 (H. A. S.); ♂, VII-8, 1921 (H. A. S.), to VIII-10, 1917 (A. H. A.). Alsea, ♀, VII-29, 1922 (H. A. S.), to VIII-2, 1921; ♂, VIII-5, 1921 (H. A. S.), to VIII-18, 1917 (A. H. A.). Alsea Mountain, ♂, VIII-2, 1925 (H. A. S.). Corvallis, ♀, III-11, 1926 (H. A. S.), to IX-28, 1905 (Thomson); ♂, VII-4 (W. J. C.), to VIII-3, 1900, ♀, V-27, 1906 (Farrell), to VIII, 1906 (Buchanan). Hillsboro, ♀, VII-8, 1905 (Cate), Kings Valley (Benton County), ♀ and ♂, VII-20, 1905 (Vincent). McKenzie Pass (elevation 4650 feet); ♂, VIII-10, 1925 (G. R. McG.). Medford, ♀, VI-23, 1906 (Bennett); ♀, VII-25, 1906 (Bennett). Monroe, ♂ and ♀, VII-25, 1905 (Nichols). Portland, ♂, VIII-27, 1907. Salem, ♂, IX-24, 1921 (H. A. S.). Tangent, ♀, VII-7, 1922 (H. A. S.).

24. BREMUS FERVIDUS (Fabricius)

Fabricius, 1798, p. 274 (Apis), North America. (Redescribed: Franklin, 1912, p. 388.).

B. pennsylvanicus (Viereck) *et al.*, 1904, p. 98, Condon, Oregon (Cordley).

Range: Southern Canada and the United States, with the possible exception of the extreme southeast.

B. fervidus is not uncommon in the lower altitudes of western Oregon and has been taken as high as 4000 feet.

Albany, ♂, VIII-10, 1917 (A. H. A.). Alsea Mountain, ♂, VIII-2, 1925, and VIII-5, 1924 (both H. A. S.). Corvallis, ♂, VII-17, 1925 (H. A. S.), to VII-29, 1914 (L. G. Gentner). Mary's Peak (elevation 4000 feet), ♂, VII-7, 1914 (A. L. L.). Peedee, ♂, VI-20, 1905 (Vincent), Sherwood, ♂, VII-29, 1906 (Hays).

25. BREMUS CALIFORNICUS (Smith)

Smith, 1854, p. 400, n. 57, ♀, (not the ♂), California. (Redescribed: Franklin, 1912, p. 393.)

Cresson, 1879, p. 230, Oregon; Viereck *et al.*, 1904, p. 99, Corvallis and Mount Hood, Oregon; Franklin, 1912, p. 398, Oregon; Frison, 1927, p. 373, Olney, Newport, Coleston, Corvallis, Mary's Peak (Benton County), Oregon.

Range: Alaska to Lower California and east to the Rocky Mountains. *B. californicus* appears to be confined to the lower valleys. It is one of the more common species in the Willamette Valley and along the coast.

Albany, ♀, VII-31, 1917 (M. C. Lane); ♂, VIII-10, 1917 (A. H. A.). Alsea, ♀, VII-1, 1925 (H. A. S.), to VIII-18, 1917 (A. H. A.). Amity, ♂, VII-13, 1900 (Smith). Bellfountain, ♀, VII-13, 1924 (H. A. S.). Coos Bay, ♀, VII-3, 1926 (H. A. S.). Corvallis, ♀, IV-3, 1906 (Farrell), to IX-24, 1906 (Sprague); ♂, VIII, 1907, to IX-4, 1921 (H. A. S.); ♀, VI-20, 1924 (H. A. S.), to VIII-30, 1907. Eugene, V-23, 1922 (H. A. S.). Forest Grove, ♀, V-8, 1917 (M. C. Lane), to VII-22, 1921 (L. P. R.); ♂, VII-22, 1921 (L. P. R.); ♀, VII-15, 1921 (L. P. R.), to IX-17, 1915 (L. P. R.). Grants Pass, ♀, VII-1, 1925 (H. A. S.). Medford, ♀, VI-25, 1906 (Bennett). Milwaukee, ♀, IX, 1907 (Hazel Allen). Peedee, ♀, VII-20, 1905 (Vincent). Portland, ♀, VII-19, 1907 (Hazel Allen). Salem, ♀, IX-24, 1921, and IX-28, 1925 (both H. A. S.). Shedd, ♀, VIII-5, 1924 (H. A. S.). Sherwood, ♀, VIII-9, 1906.

26. BREMUS CALIFORNICUS var. CONSANGUINEUS
(Handlirsch)

Handlirsch, 1888, p. 239, Vancouver Island and mainland, British Columbia.

Range: Washington, Oregon, and California.

This rare variety has been taken only at Ashland and Corvallis.

Ashland, ♂, VII-2, 1926 (H. A. S.). Corvallis, ♂, VII-25 and IX-4, 1925 (D. A. W.).

27. BREMUS CALIFORNICUS var. DUBIUS (Cresson)

Cresson, 1863, p. 97, western Kansas (Norton).

Range: Oregon, Washington, California, and Colorado.

The only records of this variety for western Oregon are two queens taken by the writer April 24, 1926, and May 10, 1925, at Corvallis.

1. PSITHYRUS INSULARIS Smith

Smith, 1861, p. 155 (*Apathus*), ♀, Vancouver Island, British Columbia (Lyll). (Redescribed: Franklin, 1912, p. 455.)

Bombus interruptus Green, 1858, p. 11, ♀, Oregon; Viereck *et al.*, 1904, p. 100, ♂, ♀, Corvallis (Cordley); Franklin, 1912, p. 457, Oregon; Sladen, 1915, p. 84 (records taking a *P. insularis* in the nest of *Bremus flavifrons*); Frison, 1927, p. 374, Newport, Oregon.

Range: Alaska to Oregon, Colorado, and New Mexico (high altitudes), east to Nebraska.

The species seems to be rare in western Oregon. It ranges from sea-level to about 6000 feet elevation.

Coos Bay, ♂, VI-16 to VII-3, 1926 (both H. A. S.). Corvallis, ♀, 1898. Cascadia, ♂, VIII-2, 1924 (H. A. S.). Mary's Peak (Benton County, elevation 4000 feet), ♂, VIII-2, 1926 (H. A. S.). Newport, ♀, V-15 and V-30, 1926 (both H. A. S.). Sand Mountain (Santiam Forest, elevation about 5475 feet), ♀, VI-20, 1906. Triangle Lake (Lane County), ♀, V-24, 1925 (H. A. S.).

2. PSITHYRUS CRAWFORDI Franklin

Franklin, 1912, p. 464, ♀, ♂, Placer County, California, Oregon. Frison, 1926, p. 137; 1927, p. 374, Newport, Oregon.

Range: Probably southwestern United States.

No locality is given for the type taken in Oregon. The species has been taken in only three recorded localities in the state. Apparently it is a coastal form. One unlabeled queen is in the collection at the Oregon State Agricultural College.

Alsea, ♂, VIII-2, 1921 (H. A. S.). Waldport (Lincoln County), ♂, VI-5, 1925 (H. A. S.). Coos Bay, ♀, VII-3, 1926 (H. A. S.); ♂, VI-16 to VII-20, 1926 (both H. A. S.).

Bequaert and Plath (1925, p. 274), suggest that "the host of *P. crawfordi* is either *Bremus vosnesenskii* or *B. occidentalis*."

3. PSITHYRUS SUCKLEYI Green

Green, 1860, p. 169, ♀, Puget Sound (Suckley). (Redescribed: Franklin, 1912, p. 471.)

Bequaert and Plath, 1925, p. 275, Mary's Peak (Benton County), Oregon (W. J. Chamberlin, collector); Frison, 1926, p. 137; 1927, p. 373, Mount Hood, Oregon.

Range: British Columbia to California and east to Colorado.

The localities from which this species is recorded indicate it is more common at altitudes of about 4000 feet. Males were abundant August 14, 1926, on *Rudbeckia occidentalis* in the Three Sisters region at an elevation of 3825 feet.

Albany, ♂, VIII-10, 1917 (A. H. A.). Alsea, ♂, VIII-10 and VIII-18, 1917 (A. H. A.). Corvallis, ♀, IV-25, 1926 (H. A. S.), ♂, VIII-10, 1917 (A. H. A.). Graham (?), ♀, VII-14, 1906. Mary's Peak (elevation 4000 feet), ♀, V-30, 1924 (H. A. S.), ♂, VIII-2, 1926 (H. A. S.). Waldport, ♂, VI-5, 1925 (H. A. S.). The Three Sisters region; Deer Butte (elevation 4650 feet), ♂, VIII-9, 1926 (H. A. S.); Fingerboard Prairie (elevation 3825 feet), ♀, and ♂, VIII-14, 1926 (H. A. S.); Scott Lake (elevation 4650 feet), ♀, VIII-7, 1926 (H. A. S.); ♂, VIII-2 to VIII-15, 1926 (H. A. S.).

4. PSITHYRUS FERNALDÆ Franklin

Franklin, 1911, p. 164, ♀, Orono, Maine; Amherst, Massachusetts; Webster, Durham, Crawfords, Mount Washington and Conway, New Hampshire; Ithaca, New York; Mount Rainier, Washington; Kaslo and Metlakatla, British Columbia; Nushagak and Sitka, Alaska. (Redescribed: Franklin, 1912, p. 473.)

Frison, 1922, p. 326, ♂, Corvallis, Oregon; 1926, p. 137; 1927, p. 374, Waldport, Newport, Marshfield, Oregon.

Range: Alaska, Canada, and the United States south to the upper Mississippi Valley, Colorado, and northern California, east to the Atlantic Ocean.

This species appears to be more common in the coast mountains and lower Cascades than elsewhere.

Alsea, ♀, VI-4, 1921 (H. A. S.); ♂, VIII-18, 1917 (A. H. A.). Brookings, ♂, VII-8, 1925 (H. A. S.). Sexton Mountain (Josephine County, elevation 2046 feet), ♂, VI-30, 1925 (H. A. S.). Triangle Lake (Lane County), ♂, V-24, 1925 (H. A. S.). Wahtum Lake Mount Hood region elevation 3700 feet, ♂, VII-24, 1923 (H. A. S.). Waldport, ♂, VI-5, 1925 (H. A. S.).

5. PSITHYRUS FERNALDÆ var. WHEELERI

(Bequaert and Plath)

Bequaert and Plath, 1925, p. 265, ♀, ♂, holotype, M. C. Z., 15,280, female; Oregon, Benton County, Mary's Peak, July, 1916 (W. J. Chamberlin, collector); paratype, female, Cala., Sierra Nevada (Edwards, collector). Allotype and paratype, males, Cala., Alta Meadow, Sequoia National Park, 9000 feet, August 23, 1917 (Cornell University Biological Expedition, W. M. Wheeler collector).

Frison, 1927, p. 374. Mount Hood, Waldport, Marshfield.

Except for the types listed above, the following are the only records for Oregon. The variety seems to be rare, but widely distributed over western Oregon.

Alsea, ♂, V-29, 1926 (H. A. S.). Coos Bay, ♂, VI-20 and VII-20, 1926 (both H. A. S.). Mary's Peak (Benton County, elevation 4000 feet), ♂, VIII-2, 1926 (H. A. S.). Neah-Kah-Nie Mountain (Tillamook County), ♂, VI-29, 1919 (L. P. R.). Newport, ♂, V-15, 1926 (H. A. S.). Three Sisters region; Fingerboard Prairie (elevation 3825 feet), ♂, VIII-14, 1926 (H. A. S.); Frog Camp (elevation 4700 feet), ♂, VIII-15, 1926 (H. A. S.); Scott Lake (elevation 4650 feet), ♂, VIII-7, 1926 (H. A. S.).

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RICE BUGS

During past years, and particularly during 1926 and 1927, there have been numerous reports relative to the injury to rice by certain so-called rice bugs. These insects appear in the rice fields just as the heads of grain are beginning to form and feed upon the kernels causing deformation and spotting known as "pecky rice." Two species received from F. Brunk, Cajeme, Sonora, Mexico, on September 20, 1927, were determined by E. P. Van Duzee of the California Academy of Sciences as *Soluba insularis* Stål and *Mormidea prominula* Dallas. They are closely related genera of the family *Pentatomidæ*. The requests from the rice growers of Mexico for assistance in the control of these and other pests cannot possibly be met from this long distance, regardless of our desire to help them. Rather it will be necessary to have an entomologist at hand during much of the year or at least during the growing period of the crop to adequately work on the life history of the insects and advise as to control measures.—E. O. Essig.

CALIFORNIA MICROLEPIDOPTERA III

BY H. H. KEIFER
San Francisco, California

GELECHIIDÆ

Recurvaria ceanothiella Braun

This species, which was described from the yellow pine forest region of the Sierra Nevada mountains as feeding on *Ceanothus divaricatus* Nutt., is here recorded from Marin County, California, as occurring at Mill Valley, Phoenix Lake, and Lagunitas. In Marin County *Ceanothus thyrsiflorus* Esch. and *C. soledadensis* H. and A. are the species infested. *Ceanothus thyrsiflorus* and *soledadensis* are very similar and occur in the coastal humid region. *C. divaricatus* is evidently much the same as it occurs in a region which has many of the same or closely related plants to those of the coast. It may be mentioned here that some species of the genus *Ceanothus* are entirely unsuited in structure to the needs of this moth.

The larva of *ceanothiella* is a leaf miner as described by Miss Braun. The mine is narrow and linear at first, with side branches. The main part of the mine is typically "horseshoe" shaped, extending apically along one side of the midrib, curving over below the apex, and back on the other side. The larva with head inward may be found at one end of the main gallery in the entrance hole, which opens from the underside of the leaf and over which is spun a silken covering. The frass is voided, none being found in the mine. On nearing maturity the larva mines out the leaf in all directions, forming more of a blotch mine and scattering the frass throughout. These mines were noted from March 5 to April 16, 1927. Pupation is as described by Miss Braun.

The body of a young larva is creamy white, but on nearing pupation is as follows: Body generally cream-white, heavily overlaid pink; head flattened, ochreous or light brown, sides blackish; prothoracic shield body-color or slightly ochreous; last abdominal segment and anal plate lighter than abdomen; tubercles very weak, uncolored; hairs short, colorless; crochets unevenly biordinal, circle complete, 18 to 22; length 6 mm.

Pupa: Anterior end rather blunt, body widest at metathorax, tapering to rather acute caudal end; ventral line from middle of body to caudal end more convex than corresponding dorsal line; brownish or brownish-ochreous; surface glabrous except for usual hairs which

are short and inconspicuous. Maxillæ rather wide at base, short, ending at convergence of midlegs; forelegs ending along sides of maxillæ; midlegs ending at convergence of antennæ; antennæ diverging just before tips exposing ends of hind legs, which end even with antennæ and wing cases on, or a little past, anterior margin of the seventh abdominal segment. Abdomen quite short, extreme tip blunt, no free segments, no cremaster but a number of hooked hairs on caudal end. Length, $3\frac{1}{2}$ to 4 mm.

The male genitalia of this species are small, entirely lacking harpes. The uncus and œdeagus are the only conspicuous parts, supported by a heavy tegumen.

Adults emerged in the laboratory from April 20 to June 10, 1927.

Recurvaria francisca Keifer, new species

This grayish species is very similar to the preceding in adult appearance, but the ground color is not as definitely ochreous-tinged if at all, and the dark coloring is noticeably not as black. There are greater differences than the adult appearance which will be subsequently noted. This is, however, an obscurely marked species, and the following description attempts to take in the variations:

Palpi rather slender; basal two-thirds of second joint black, white above inwardly, apical third white mottled blackish or with an incomplete black annulus; terminal joint inclined to be rough apically, white, black at extreme base, black annulus just below middle, wide black annulus just below tip, extreme tip white. Antennæ with basal joint whitish below in front, blackish fuscous above; stalk usually with alternately lighter and darker annulæ, the lighter widest. Head above white, each scale tipped dark fuscous; face white slightly ochreous, shining, faintly mottled fuscous at sides. Thorax white generally obscured by dark fuscous; two opposite black dots touching posterior margin just before tip; tegulæ as head. Forewings whitish, each scale tipped with dark fuscous, with a number of black dots on wings and three dorsal scale tufts; a blackish shade from costal base, running obliquely outward and ending just across fold in black tuft which is outwardly white, opposite which well within costa is a black spot more or less completely edged white; just beyond these at costal third a conspicuous black spot more or less surrounded by white, opposite which is a black dorsal tuft touching the fold and between these a black spot, sometimes edged outwardly by a white spot which is often followed by another black dot; the third black tuft well within tornus, and almost opposite this from costa, a more or less distinct narrow whitish fascia runs directly in for a short distance, turns abruptly outward and curves down to outer margin not halfway to apex from tornal tuft; a blackish apical

spot at base of cilia preceded on bases of costal and outer marginal cilia by two or three more or less distinct black spots; sometimes a blackish area well within apex; tornal cilia light fuscous. Hind wings light fuscous, cilia same, slightly ochreous-tinged. Abdomen whitish suffused fuscous, darker dorsally. Fore and midlegs white, heavily overlaid except at apices of joints with blackish fuscous; hind legs ochreous white, a broad fuscous stripe along outer side of tibiae, broken by a white spot at inner spurs, tarsi mottled fuscous at bases outwardly. Expanse, 8 to 12 mm.

Holotype, male, No. 2539, and *allotype*, female, No. 2540, Mus. Calif. Acad. Sci., reared from *Ceanothus thyrsiflorus* Esch. in San Francisco, California, by the author, April 27 and 25, 1927, respectively. Fifty-three *paratypes*, males and females, reared from *Ceanothus thyrsiflorus*, collected in San Francisco, and in Mill Valley, Marin County. Eight *paratypes* from *Ceanothus soledianus* H. and A., the larva collected at Phoenix Lake, Marin County. These *paratypes* emerged from February 13 to August 19, 1927. The specimens from Marin County are generally less maculated than those from San Francisco, but agree in general appearance, larval habit and genitalia. Four *paratypes* are in the collection of Miss A. F. Braun, four in the collection of Dr. Barnes, and four in the United States National Museum.

The genitalia of *francisca* are small but with all the usual organs present. The harpes are rather short, slender and symmetrical, with large basal lobes. Thus *francisca* differs from *ceanothiella* in possessing harpes.

The mine of the new species is a rusty-colored blotch, typically beginning at or near the apex of the leaf. The entire substance between the two epidermal layers of from one-half to the whole leaf is eaten in the course of the larval life. The epidermis is preserved as nearly intact as possible and the frass is not voided but spun back in the older parts of the mine on each side of the larval retreat. On maturing, the larva cuts its way out of the newer portion of the mine, leaving the frass scattered, and probably pupates in trash below the bush in a cocoon spun between two or more objects. Mature larvæ were found from late January to June, 1927.

The young larva has a black head and shield with a sordid white or grayish body. Later the body becomes whiter and then slightly bluish. *Mature larva*: Head flattened, deep brownish black with brown mouthparts; thoracic shield variously shaded with brownish black,

usually almost body-color anteriorly, grading into deep brownish black on posterior half or two-thirds, median line narrow. Body usually bluish white more or less overlaid pink especially on abdomen; anal plate yellowish to fuscous; gonads dark fuscous; ganglia visible ventrally; thoracic legs black on chitinized parts; prolegs often with a fuscous annulus, crochets in a complete circle, unevenly biordinal, 22 to 28; tubercles very weak, uncolored, hairs fine, uncolored; length, 6 to 7 mm.

The pupa is essentially the same as that described for *ceanothiella* but differing in that the maxillæ are slightly shorter, the maxillary palpi smaller and the hind legs more nearly approaching the posterior margin of the seventh abdominal segment.

The most striking external differences between *francisca* and *ceanothiella* are in the larval appearance and habit, which may be summarized as follows: *francisca*—head and shield of larva blackish, body sordid white or bluish white, mine a blotch, frass not voided; *ceanothiella*—head of larva ochreous, shield and body creamy white, mine typically linear and branching, frass voided through a hole at one end of the mine.

In placing the new species in the genus *Recurvaria* the venational characters were relied upon to the exclusion of the genitalic and larval characters. The only point of difference which either of these species shows from the genus *Tosca* is in the venation, which is as in the genus *Recurvaria*; all other characters mentioned in the definition of *Tosca* are present. A comparison of the pupæ of these species with that of *Recurvaria bacchariella* Keifer (a true *Recurvaria*) shows several marked differences: *francisca* and *ceanothiella*—pupa with maxillæ ending at the convergence of the midlegs, abdomen with no movable sutures and much shortened; *bacchariella*—maxillæ of pupa ending at convergence of antennæ, abdomen not shortened and with three flexible sutures. It does not appear advisable to disregard the venation at present, but it is felt that this combination of characters should be mentioned .

ORTHOPTERA WANTED

I am revising the species of the genera *Ceuthophilus* and *Pristoceuthophilus* (Orthoptera, Tettigoniidæ, Raphidophorinæ), and will be glad to determine material of these genera from any part of the country. I desire especially to see western material.—T. H. Hubbell, Museum of Zoology, University of Michigan, Ann Arbor, Michigan.

ON THE IDENTITY OF FOUR SPECIES OF
GEOMETRIDÆ (LEPIDOPTERA)

BY WILLIAM BARNES AND F. H. BENJAMIN

Decatur, Illinois

LEPIODES SCOLOPACINARIUS Gn.

This species was described by Guenée, 1857, Spec. Gen., X, 360, from 1 ♂ 1 ♀. A male and female from the Oberthür collection are in the Barnes collection. These bear labels "Etats Unis," "Ex Musæo Ach. Guenée," "Ex Typicalibus Speciminibus." The last-mentioned label is a subsequent one often pinned on Guenée collection specimens; in one case this label is on the pin of a specimen which also bears a Guenée handwritten label saying the specimen served for his description; at other times the same labels are on specimens which are not likely to be types. The exact meaning of the label is, therefore, vague.

The pair of *scolopacinaris* were sent as types, and as they agree perfectly with the original description, the male being the dark form and the female the light form, there is every reason to consider these specimens types, or at last typical.

The species appears to be more variable in the male than in the female, the dark male form appearing to be much more common than the pale male form, and hence both type form and normal form. Incidentally all intergrades occur between the dark and light males. If the species' name is held to the common dark male the synonymy will be:

Tornos scolopacinaris Gn.

pervelata Wlk.

robiginosus Morr.

rubiginosaria Pack.

abjectarius Hlst.

piazata C. and S.

calcasiata C. and S. (partim., ♀ nec ♂).

form ♂ *calcasiata* C. and S.

We cannot distinguish between ♂ ♀ *piazata* and ♂ ♀ *scolopacinaris*, nor can we distinguish between paratype females of *piazata* and *calcasiata*. According to paratypes of *kerrvillaria* C. and S. this name will probably also fall to *scolopacinaris*.

HYDRIOMENA PLUVIATA Gn.

- 1857, Guenée, Sp. Gén., X, 378, *Ypsipetes*.
 1876, Packard, Mono. Geom., p. 91, *trifasciata*, *Hydriomena*.
 1912, Swett, Can. Ent., XLIV, 226-227, *Hydriomena*.
 1917, Barnes and McDunnough, Contrib., IV, (1), 24, (partim. nec figs.), *Hydriomena*.
 1920, Oberthür, Et. Lép. Comp., XVII, 203, pl. DVII, ff. 4237-4238, *Ypsipetes*.
 1921, Barnes and Lindsey, Ent. News, XXXII, 254, *Hydriomena*.
 1922, McDunnough, Ent. News, XXXIII, 229, *Ypsipetes*.

This name seems to have caused considerable confusion. Packard placed it as a synonym of *trifasciata* Bork.; Barnes and McDunnough, as being the same as *divisaria* Wlk.; Swett suggested *pluviata* as possibly the correct name for *cærulata* Auct. nec Fabr. with *perfracta* Swett as being the variety mentioned by Guenée; Barnes and Lindsey placed Oberthür's figure 4238 as *cærulata* Fabr., a species probably not occurring in North America, but comment that they cannot place figure 4237; McDunnough stated Oberthür's figures not conspecific, and restricted the name to the species figured as 4238, assigning figure 4237 to ? *renunciata*, and 4238 to *frigidata*.

Both specimens figured by Oberthür are in the Barnes collection. They bear labels "Ex Musæo Ach. Guenée," and "Ex Typicalibus Speciminibus," the female (Oberthür f. 4237) also bearing a label "Am. bor."

We have above commented on the meaning of the label "Ex Typicalibus Speciminibus." We suspect that these specimens are types, and that McDunnough's restriction will hold.

The female is in very poor condition, rubbed, and lacking abdomen. The t. a. line, however, can be discerned, and it is rather irregular, suggesting that McDunnough's placement as *renunciata* is correct.

The male to which McDunnough restricted the name is different from any of our *frigidata*. Examination of the uncus shows the tubercle or ridge at the base, the character used in the Barnes and McDunnough Hydriomenid Revision to separate *transfigurata* Swett from *frigidata*. We possess a single male paratype of *transfigurata*. The male *pluviata* agrees with this in all details of maculation as well as genitalia. We have not made a slide of the male *pluviata*, but its uncus is plainly visible.

The name *frigidata* Wlk. may, therefore, be restored as a valid species; *pluviata* Gn. (partim., ♂ nec ♀) takes priority over *transfigurata* Swett; *renunciata* Wlk. takes as synonym *pluviata* Gn. (partim., ♀ nec ♂).

ACIDALIA PURATA Gn.

This species was described by Guenée, 1857, Spec. Gén., IX, 488.

There are four old examples in the Barnes collection received under this name from the Oberthür collection including the specimen figured by Oberthür (f. 5083) which is labeled type in Oberthür's handwriting. We have little doubt that some of these examples are types. Three of them are of the species going in collections as *nigrocandida* Hlst. and supplied to us under that name by Mr. Lemmer. The other specimen appears to be *lautaria* Hbn. As *lautaria* was redescribed by Guenée as *myrmidonata* we rather suspect that the fourth example is not a type of *purata*.

We have been unable to compare with Hulst's type, but have little doubt that *nigrocandida* has been correctly determined in the past. We know of nothing else which might fit Hulst's description.

Guenée figured *purata* (Atlas, pl. VII, f. 6). This figure does not resemble the supposed types and violates the original description. We suspect that the figure was carelessly made and also that lead in the paint pigments has caused not only this figure, but other figures in the Guenée Atlas to become considerably darkened. The supposed types agree perfectly with Guenée's description.

Acidalia cacuminaria Morr. (*cacuminata* Pack.) takes the place of *purata* Auct. nec Gn. By no stretch of the imagination can *cacuminaria* be made to fit Guenée's description of *purata*.

EURYMENE EMARGATARIA Gn.

Guenée, 1857, Spec. Gén., IX, 145, proposed the name *emargataria* as a nom. nov. for *fervidaria* H.-S. nec Hbn., but at the same time states, "J'avais décrit cette espèce depuis longtemps, quand la figure de M. Herrich-Schæffer a paru."

The correct use of the name *emargataria* presents problems in nomenclature which do not seem to be entirely covered by the present International Code.

Herrich-Schæffer described *fervidaria*, 1855, Ausser. Schmett., p. 63; f. 203; as *Plagodis fervidaria* (Ellopia Gn.), and on page 80 places his specific name in the genus *Eurymene* also citing *Ellopia* "Gn." and *Plagodis*.

Guenée's rule of homonyms does not correspond with our present ideas in that he would not allow the same specific name to be employed twice in any family. This is probably the reason he sunk *fervidaria* H-S. as a homonym of *fervidaria* Hbn. Nevertheless, Guenée employs *Ellopia* Treit. for *fervidaria* Hbn., and also the Hubnerian specific name is at present placed in *Ellopia*.

The question at once arises, "Is *fervidaria* H.-S. in reality a homonym of *fervidaria* Hbn. because of the Herrich-Schæffer citation of "(*Ellopia* Gn.)?"

The original female specimen from which Guenée described *emargataria* (in part) and which served as the type for his manuscript name is not the same as *fervidaria* H.-S., unless the Herrich-Schæffer figure be very poor, and is the species going in collections as *arrogaria* Hlst.

In view of Opinions 53 and 78 of the International Zoological Commission Guenée's manuscript type acquired status upon its publication in 1857, even though Guenée misdetermined the Herrich-Schæffer species and considered his species to be the same.

On the other hand a name proposed as a nom. nov. is usually considered to have as its type the type of the older name.

Thus *emargataria* Gn. (partim.) appears applicable and available for two different species.

Not knowing just what to do with the name *emargataria* we are listing it under both *fervidaria* H.-S. and *arrogaria* Hlst., leaving the final settlement of the problem to some subsequent revisional worker.

CELERIO GALLII INTERMEDIA Kirby

An individual of this hawkmoth was taken by Mr. George Haley at flowers of *Polymonium*, July 1926, on St. Paul Island, Alaska. Dr. G. Dallas Hanna had taken one on that island some years before, and a Dr. Hunter had seen one at light on the Station window, so this moth may be added to the fauna of that island.

DISTINCTION BETWEEN THREE SPECIES OF
EUMERUS (SYRPHIDÆ, DIPTERA), WITH
DESCRIPTION OF A NEW SPECIES

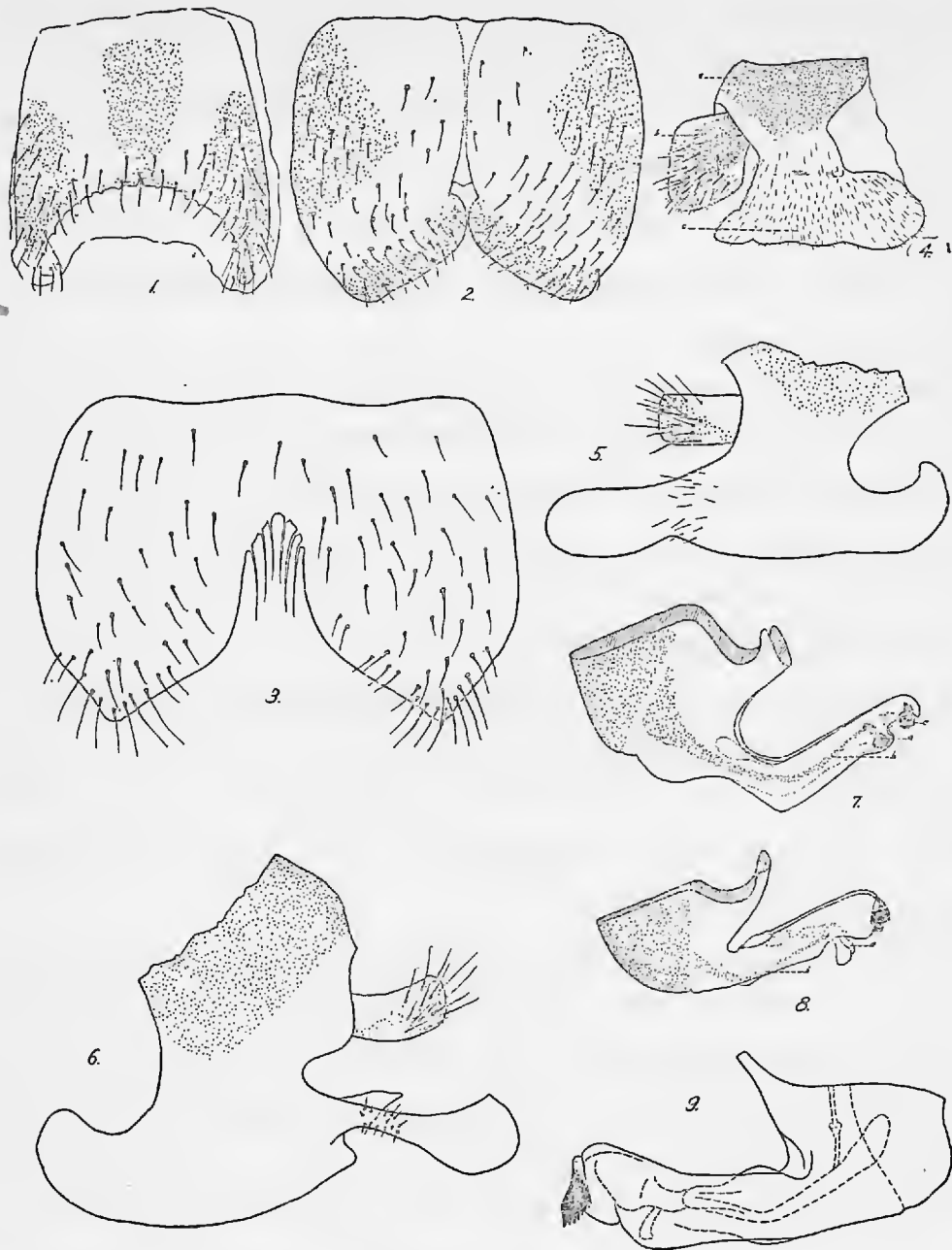
BY LESLIE M. SMITH

Berkeley, California

Knowledge of the species of *Eumerus* now established in the United States seems to be very meager. Most writers have published notes on damage, and occurrence, under the name of *Eumerus strigatus* Fallén. Although some sixty species, many of which are probably synonyms, are recorded in Europe, most American workers have regarded all specimens taken in this country as *E. strigatus*. In an article published in *Entomologist's Monthly Magazine*, May 1920, Mr J. E. Collin called attention to the fact that *E. strigatus* was not the only injurious species of this genus, but that the little known species, *E. tuberculatus* Rondani, was often found attacking bulbs. Mr. Collin pointed out that many references to *E. strigatus* probably referred to *E. tuberculatus*.

While making a study of the internal anatomy of the male reproductive system of what was believed to be *E. strigatus*, the writer became aware of the fact that two species were being examined. Investigation of the literature, together with determinations by several authorities on this group, showed one species to be *E. tuberculatus* while no name could be found for the other. Obviously it was not *E. strigatus*. All of the specimens were reared from bulbs of *Narcissus* collected in Santa Cruz, California.

The three species here dealt with, namely, *Eumerus strigatus* Fallén, *E. tuberculatus* Rondani, and *E. narcissi* n. sp., are so nearly identical in appearance that they can be distinguished only with considerable difficulty. Dr. F. R. Cole in *Entomological News*, Vol. XXXI, p. 31, 1920, gives a complete description of *E. strigatus*. The other two species differ so slightly from this that a general description will be omitted here and only certain characters in which they vary will be mentioned. Of these characters the shape of the fifth sternite, and certain features of the anal appendages and genitalia are most valu-



EXPLANATION OF FIGURES

- Fig. 1. Fifth sternite of *E. narcissi*.
 2. Fifth sternite of *E. tuberculatus*.
 3. Fifth sternite of *E. strigatus*.
 4. Lateral view of anal appendages of *E. narcissi*.
 b—anal cercus; c—style.
 5. Lateral view of anal appendages of *E. tuberculatus*.
 6. Lateral view of anal appendages of *E. strigatus*.
 7. Lateral view of genitalia of *E. narcissi*.
 a—position of internal lobes, b—position of sustentacular apodeme, c—superior lobe.
 8. Lateral view of genitalia of *E. tuberculatus*.
 9. Lateral view of genitalia of *E. strigatus*.

All figures by about 110. Fig. 9 redrawn from Collin.

able. Mr. Collin in the reference previously cited illustrated the characters above mentioned. In the following descriptions of the male terminalia, the terminology suggested by C. L. Metcalf (Ann. Ent. Soc. Am., Vol. 14, p. 169), is used.

EUMERUS STRIGATUS Fallén

Male. Fifth sternite with a notch in the median line of the posterior margin. Postero-lateral corners of chitinized area of fifth sternite gently rounded to give a bilobed appearance. Margin of each pseudolobe entire. Anal cerci small, club-shaped, bent away from the styles. Styles elongate, bearing a distinct terminal enlargement and a lateral accessory tooth on the inner surface. Genitalia straight. Superior lobes terminal on sheaths. Hind femora and tarsi without basal tubercles below. (See Figs. 3, 6, and 9.)

Length, 5.5 to 7.5 mm.

EUMERUS TUBERCULATUS Rondani

Male. Fifth sternite with a notch in the median line of posterior margin. Sides of the notch indented laterally into the sternite. Chitinization heavy on the sides, membranous in the median line. Lateral corners somewhat rounded, giving a bilobed appearance. Margin of each pseudolobe entire. Anal cerci small, straight-sided and bluntly truncate, not bent away from styles. Styles elongate, not greatly enlarged terminally, bearing no accessory tooth, having distally a few heavy, recurved spines on the inner surface. Genitalia straight. Superior lobes terminal on sheaths. Hind femora and tarsi bearing basal tubercles below. (See figs. 2, 5, and 8.)

Length, 5.5 to 7.0 mm.

Eumerus narcissi L. Smith, spec. nov.

Male. In general appearance closely resembling the other two species mentioned. Fifth sternite without a notch in posterior margin. Posterior margin arcuato-emarginate, covered with minute, blunt projections. Postero-lateral corners prolonged. Chitinization heavy in the center. Anal cerci large, nearly rectangular in lateral view. Styles very much reduced, no terminal enlargement. Genitalia with a distinct angle. Superior lobes slightly subterminal. Hind femora and tarsi without basal tubercles below.

Length, 5.5 to 7.0 mm.

Thus far the author has not been able to distinguish the females of these various species, but no doubt future studies of these closely related forms will reveal characters by which they may be recognized.

THE GENUS BRACHYPTEROMYIA WILLISTON
(DIPTERA PUPIPARA; HIPPOBOSCIDÆ)

BY G. F. FERRIS

Stanford University, California

The genus *Brachypteromyia*, of the family Hippoboscidae, was named by Williston in 1896 for the reception of the single species, *B. femorata* Williston. It has since been recognized that this species is unquestionably identical with the earlier described *Anapera fimbriata* Waterhouse, but the genus *Brachypteromyia* has been accepted as valid. Through the kindness of Dr. V. M. Tanner I have been enabled to examine two specimens of this species. It is evident that the genus is purely a synonym of *Myiophthiria* Rondani.

These two genera have presumably been separable by the character of the wings. In *Brachypteromyia* they are described as "minute, projecting but little beyond the scutellum," while in *Myiophthiria* they attain about half the length of the abdomen. With the rediscovery of the type species of *Brachypteromyia* it appears that this difference has been exaggerated. Although the wings in the latter species are shorter than in those which have been referred to *Myiophthiria* they are of the same type and the difference cannot be regarded as more than specific.

There is the more reason for uniting the two genera, since all the species occur upon birds of the family Micropodidae, the swifts, and to separate them generically is merely to obscure the facts concerning this peculiar distribution.

MYIOPHTHIRIA FIMBRIATA (Waterhouse)

Figures 1, 2

1887. *Anapera fimbriata* Waterhouse, *Proc. Zool. Soc., London*, 164; fig. 163.
 1896. *Brachypteromyia femorata* Williston, *Ent. News*, 7:184-5.
 1923. *Brachypteromyia fimbriata* (Waterhouse), Aldrich, *Insector Insc. Mens.*, 11:78.
 1926. *Brachypteromyia fimbriata* (Waterhouse); Austen, *Parasitology*, 18:359.

Previous records. From *Aeronautes* (as *Cypselus*) *melanoleucus*, Ft. Wingate, Arizona (Waterhouse), and (as *Macropis*) from Wyoming (Williston):

Present record. A male and a female from *Aeronautes melanoleucus*, near Tuba, Arizona.

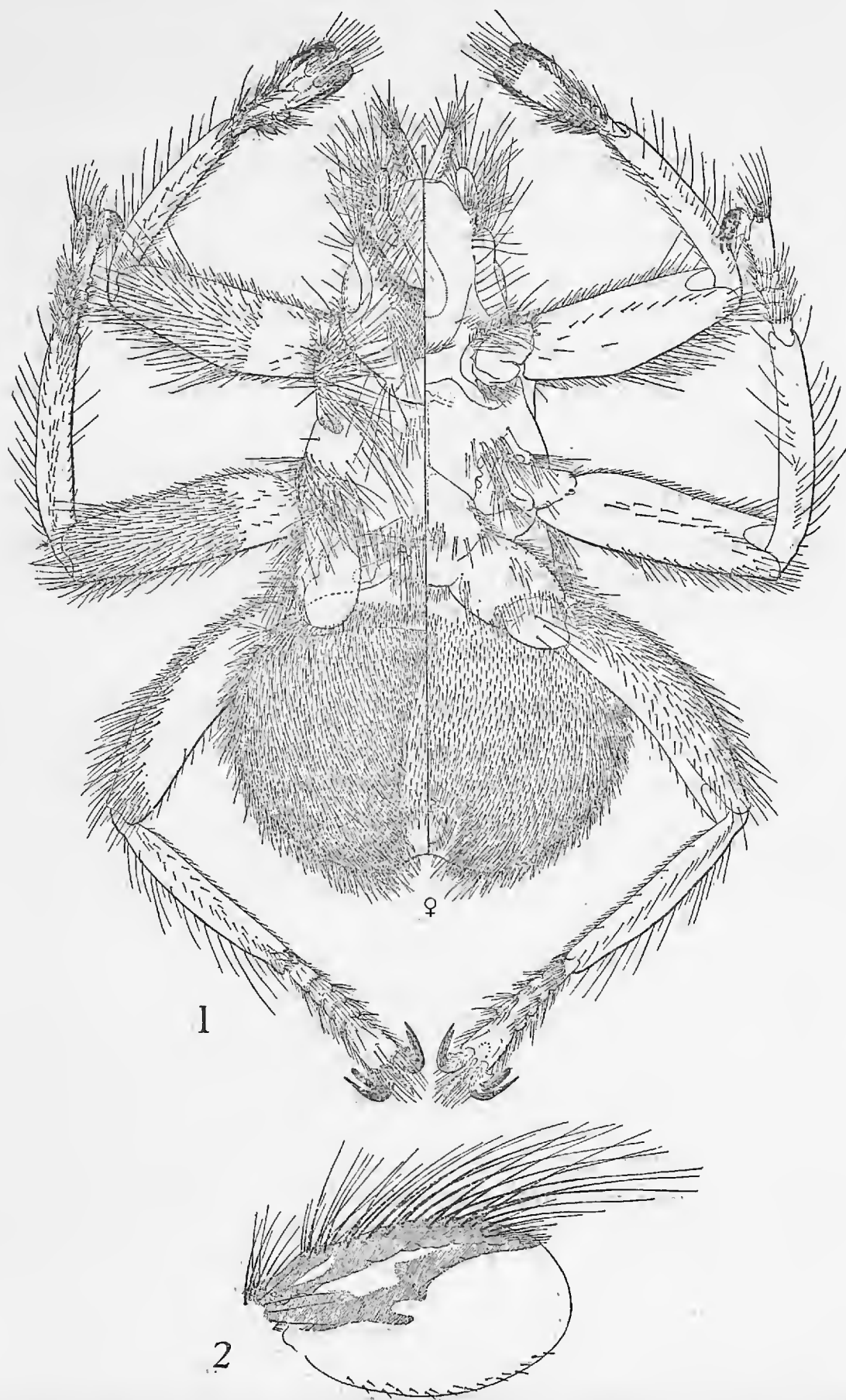


Figure 1. *Myiophthiria fimbriata* (Waterhouse); female.
Figure 2. *Myiophthiria fimbriata* (Waterhouse); wing.

Notes. Length (on slide) 8 mm. The species differs from *M. reduvioides*, which is the type of *Myiophthiria*, chiefly in its greater hairiness, in the smaller wings and in the absence of any small, dorsal plates on the abdomen (fig. 1).

The wings (fig. 2) are of the same type as in *reduvioides*, but the venation is even more reduced and confused. They extend to the posterior border of the basal plate of the abdomen. The abdomen is almost concealed beneath its vestiture of setæ, of which those near the margins are longer, both dorsally and ventrally, than those on the disc. The female shows a dorsal, median area, which is somewhat depressed, as noticed by Waterhouse, and in which the setæ are more sparse than elsewhere. In neither sex are there any dorsal plates on the abdomen. The male and female are very similar in general appearance, the male either lacking the claspers or having them very small. The œdeagus is large and prominent, but its details cannot be worked out from the single specimen at hand.

PHYTONOMUS QUADRICOLLIS LEC., A LEAF MINER

In June Dr. H. J. Pack called my attention to leaf-mining larvæ infesting *Rumex venosus* Pursh at Clearfield, Utah. On the 19th I was able to find only a few larvæ in many mined leaves. The old mines contained cocoons characteristic of the genus *Phytonomus*. Adult weevils were found in two of the cocoons. The larvæ left the mines and fed to some extent externally when in a moist chamber, but quickly resumed the mining habit when the leaves were handled as cut-flowers. Within the new mines the larvæ formed cocoons and pupated within two or three days. The pupal period was approximately one week. Emerged adults did some feeding on the dry leaves and continued to live about two weeks after the food was taken away from them. Dr. Pack kindly sent me a large quantity of adults that had emerged from mined leaves taken somewhat earlier. The species was determined by Dr. E. C. Van Dyke as *Phytonomus quadricollis* Lec., and a note was cited by him from "Genera Hypera and *Phytonomus*" (Titus, Ann. Ent. Soc. Am., Vol. IV, 1911), indicating that Norman and Evelyn Criddle collected adult weevils on *Rumex venosus* at Aweme, Manitoba. So far as the writer is able to ascertain, this is the first instance of a leaf-mining habit in the genus *Phytonomus* or in the tribe to which it belongs.—Wyatt W. Jones.

ON DINAPATE WRIGHTI HORN

BY F. H. WYMORE

Davis, California

It has been commonly supposed that the attack of the California palm borer, *Dinapate wrighti* Horn, was confined to the trunks of dead trees of the native California fan palms. During the last two years various reports received at the office of the horticultural commissioner of Riverside County, California, stated that large black beetles were injuring the growing tip of most of the transplanted fan palms about Palm Springs. On July 31, 1927, while at the Citrus Experiment Station, Riverside, I received a live female beetle through the mail with an accompanying note stating that the pest was taken from a burrow in the bud of a living fan palm at Palm Springs and that the beetles were very abundant and injuring many transplanted palms in that vicinity. Upon investigation of these reports on August 4, it was found that at least 90 per cent of the transplanted fan palms were injured by the beetles burrowing down into the succulent, growing tip of the trees. The burrows measured from five-eighths to seven-eighths inches in diameter and from about eight to sixteen inches deep. One gardener had removed as many as five beetles from a single tree and two or three were commonly taken from one tree. In a few cases it was found that the beetles had made numerous burrows into the trunks of living trees and one tree, about sixteen feet tall with a trunk about twenty inches in diameter, had been so severely injured that it had apparently succumbed to the attack in spite of an abundant water supply, and the leaves and bud had entirely withered.

Even most of the large palms which had been transplanted thirty-five or forty years ago showed the effects of beetle attack; the large characteristic masses of fibrous excelsior-like frass near the growing tip, and the elongate holes in the leaf petioles were quite common in these trees. According to the residents of Palm Springs the main flight of the beetles occurred about July 1 to 15, although some beetles were active as early as June 15 and as late as the latter part of August. Many attempts were made to control the beetles, but all resulted in killing them in most cases only after they had burrowed deeply into the plant.

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly by the Pacific Coast Entomological Society
in co-operation with the California Academy of Sciences

E. P. VAN DUZEE, Editor

S. B. FREEBORN, Treasurer

EDITORIAL COMMENT

The long-expected *List of the Insects of New York State* has now been distributed as Memoir 101 of the Cornell University Agricultural Experiment Station. It is the latest and perhaps the best yet published of such state lists. In scope it covers all orders of insects with commendable thoroughness, and includes as well lists of the Arachnida and Myriopoda of that state. The number of species listed is: of insects 15,449 and of the related classes 675. This number of the insects can be compared with the 10,385 in the 1910 New Jersey list, and the 6781 in the Connecticut list.

The typography and format of this list are most excellent, the editing and proofreading have been efficiently and carefully done, and the records are concise and in most orders very complete. Unfortunately in the Lepidoptera the collectors' names were omitted in the cases of practically all the earlier records, giving an unbalanced effect to that order and working an injustice to the earlier lepidopterists. This is especially deplorable in the case of the notable group of "Albany entomologists," whose collecting at Center, New York, and in the Adirondacks was one of the highlights in the entomology of that time. We notice one error where the residence of Mr. A. R. Grote is given as Evans Center, New York. Mr. Grote's early days were spent on Staten Island and later, while located at Buffalo, he spent two or three vacation periods with friends at Evans Center, Erie County, but he never lived there, his home being then at Buffalo.

It would have been well worth while to have added a bibliography of earlier local lists of New York insects. This New York list, as a whole, is a monument to the energy and ability of the New York state entomologists.

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Published by the
Pacific Coast Entomological Society
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San Francisco, California

1928

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in July, October, January and April by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Annual subscription \$2.00 in advance for the United States and Canada; \$2.25 for foreign countries. Subscriptions should be sent to the treasurer, Dr. Stanley B. Freeborn, University Farm, Davis, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

Twenty-five copies of author's extras will be furnished free on request. Additional copies will be supplied at cost of publication if a request is received with the manuscript.

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Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.

THE
PAN-PACIFIC ENTOMOLOGIST

Published by the
Pacific Coast Entomological Society
in co-operation with
The California Academy of Sciences

VOLUME FOUR
July, 1927, to April, 1928

San Francisco, California
1928

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The Pan-Pacific Entomologist

Vol. IV, No. 4

April, 1928

ALAUDES

BY H. C. FALL

Tyngsboro, Massachusetts

The little beetles of the genus *Alaudes* are among the most singular and interesting of our blind Coleoptera. The original specimens were collected by Dr. George H. Horn in or about 1864 in Owens Valley in eastern California, and were described by him as *A. singularis* in 1870 in his Revision of the Tenebrionidæ. Horn cites simply "California" in his description, but the locality named above is that given by me in my Coleoptera of southern California, and is doubtless correct though I cannot at the moment recall my source of information.

As indicated in the reference quoted, the next record of capture was by Professor Wickham, who about 1890 secured a few specimens in southeastern Oregon; then a single example by Koebele in the Argus Mountains of southeastern California not far south of the original habitat.

In 1893 and 1895 I took about a dozen examples from beneath boards in my garden at Pomona, California, and in 1897 Dr. Fenyes collected about an equal number at Azusa, some fifteen miles west of Pomona. Since then Dr. Fenyes, Mr. J. O. Martin and the writer have on a number of occasions taken specimens at Pasadena. In his recent paper on this genus Dr. F. E. Blaisdell mentions the taking of a single specimen by himself at San Diego in 1890, also a series collected by Nunenmacher at Goldfield, Nevada (1907), and a few examples by Dr. Van Dyke in Alameda County, California. This about exhausts the record of captures so far as known to me, and shows that the genus is distributed from southern California to Oregon.

All specimens collected conform very closely in size, appearance and general characters to the original of Horn's description, and up to the time of Dr. Blaisdell's paper (Trans. Am. Ent. Soc., 1919), it was generally assumed that of so singular an insect we had but a single species. Moreover the things were so scarce that very few collections contained examples

from more than one locality, so that opportunities for comparison were limited. Dr. Blaisdell's paper then represents the first attempt to get together and carefully compare material from different localities, and as a result of his study he has announced the existence of four distinct species in the material examined.

Aside from some quite obvious variations in the form of the erect elytral scales, and some small differences in bodily outline, there is almost nothing of moment on which to base specific distinctions, and it is quite possible that none of the observed variations are more than racial in character. I am, however, for the present inclined to accept the doctor's conclusions as in the main correct, and this view is supported by the fact that with one probable exception, so far as the material in hand is concerned, the supposed species are quite constant, and each so far as known occurs with a different species of ant.

The small and more or less illusory differences in the form of the scutellum referred to by Dr. Blaisdell I cannot believe have any specific significance, my own experience being that the scutellum is transversely triangular with but slight variation, in all forms.

It is somewhat remarkable that neither Horn nor Blaisdell anywhere speaks with precision with respect to the erect scales of the elytral intervals, the implication in their descriptions being that all the intervals are thus clothed, whereas it is always only the alternate ones that are so affected.

It is necessary to correct one error in Blaisdell's paper of which I seem to have been unwittingly the cause. His identification of *singularis* Horn is based on a series of examples taken by Mr. J. O. Martin in Pasadena, where Mr. Martin and I together collected the species, and for which I used the name *singularis* merely because I shared the general assumption that all *Alaudes* were of one species. I had not at that time seen Horn's type series, and had the doctor communicated with me I should promptly have disavowed any authority in the matter. I have since examined the Horn types and can say positively that they not only differ from this Pasadena species, but also in greater or less degree from all other species of Blaisdell's table.

On the supposition that the kind of differences observed in

this genus are of the order of specific characters, there are in my collection two other forms meriting distinctive names. The following table contains all at present known to me.

Table of Species

- | | |
|---|-------------------------|
| 1. Elytral vestiture typically slender and hair-like throughout, but varying to feebly clavate, especially toward the sides and apex; marginal setæ virtually uniform in form and length | <i>setigera</i> |
| — Elytral vestiture feebly clavate except along the side margins, where long slender setæ alternate with the much shorter clavate ones | <i>alternata</i> |
| — Elytra vestiture nearly uniformly moderately clavate throughout, form of elytra distinctly narrower and more parallel | <i>squamosa</i> |
| — Elytral vestiture consisting throughout of rather shorter capitate clavate scales of uniform length | 2 |
| 2. Hind angles of thorax including the investing scales somewhat obtuse; elytral punctures very coarse, all the interspaces narrower than the punctures | <i>singularis</i> |
| — Hind angles of thorax sharply rectangular or even a little prominent; elytral punctures rather smaller, at least toward the suture, where the interspaces are as wide or wider than the punctures | 3 |
| 3. Prothorax not appreciably narrower than the elytra, form more oblong | <i>fallax</i> |
| — Prothorax perceptibly narrower than the elytra at middle, the latter shorter and slightly oval | <i>testacea</i> |

1. ALAUDES SETIGERA Blaisd.

Trans. Am. Ent. Soc., XLV (1919), p. 310
singularis Blaisd. (not Horn), *ibid.*, p. 307

With the San Diego type of this species, characterized by Blaisdell as having the erect vestiture of the elytra "slender and hair-like," I am compelled to unite the Pasadena species erroneously regarded by him as the *singularis* of Horn. Of this latter he says: "Four of the sixteen specimens of Mr. Martin's series have all the elytral scales quite linear but not hair-like or setiform." In a good series of this species in my collection there are individuals in which the elytral vestiture, if not precisely identical, is so nearly like that of *setigera* as to forbid dissociation. Of one of these, recently sent to the doctor for an expression of opinion, he writes: "I consider it to be *setigera*." The transition between these specimens and those having the

elytral setæ in greater or less part fusiform to feebly claviform is perfectly gradational.

Type locality—San Diego, California. All other specimens known to me were taken at Pasadena, California, where they occur in the Arroyo Seco under stones, with *Formica pilicornis* Emery.

2. *Alaudes alternata* Fall, n. sp.

The chief distinguishing character of this species is the alternation of moderately slender clavate scales with much longer hair-like setæ along the lateral edge of the elytra. There is another feature not mentioned in the table which seems quite constant. In the present species the prothorax is widest close to the apical angles, from which point the sides converge obliquely backward with a moderate degree of sinuation. In *setigera* the point of maximum width is less near the front angles, the sides showing a longer anterior arcuation followed by a deeper sinuation; the hind angles being rectangular in both species. The erect elytral scales are nearly uniformly gradually feebly clavate, but some variation within narrow limits is observable on close attention. The sutural interspace is wider than the adjacent stria punctures, and the next one or two intervals are usually as wide as the punctures. The form of the elytra is nearly the same as in *setigera*.

Length, 1.6 to 1.75 mm.; width, .6 to .7 mm.

Habitat. Pomona (type) and Azusa (Fenyés), Los Angeles County, California.

The first specimen of this species was found by me November 5, 1893, beneath a board in my garden at Pomona. Two years later, during the first half of November 1895, one or two specimens at a time were found in like situations until about a dozen were secured. About half of these were distributed by myself or the late Mr. Ricksecker as *A. singularis*; six examples remain in my cabinet. None of these specimens appeared to be associated with ants, but Dr. Fenyés a few years later took a small series at Azusa in April in nests of *Solenopsis molesta*

validiuscula Emery, one of which with the host ant is in my collection.

3. ALAUDES SQUAMOSA Blaisd.

Trans. Am. Ent. Soc., XLV (1919), p. 309

This species was described from a series of specimens collected by Mr. F. W. Nunenmacher at Goldfield, Nevada, October 18, 1907. It is rather narrower, with the sides of the elytra more strictly parallel than in any of our other species. The erect elytral scales are more distinctly clavate than in the two preceding species, but less strongly so than in those which follow. Blaisdell describes the hind angles of the thorax as obtuse, but in two paratypes sent me by Mr. Nunenmacher they are not perceptibly so, and I should certainly call them rectangular. The prothorax is widest far forward, the outline being nearly as in *alternata*.

The specimen in the National Museum collection from the Argus Mountains, southeastern California, taken by Koebele, appeared to me to be referable to the present species when examined by me some years ago. The specimens sent me by Nunenmacher were accompanied by the host ant, which proves to be *Cremastogaster californica* Emery.

4. ALAUDES SINGULARIS Horn

Trans. Am. Phil. Soc., XIV (1870), p. 362

This, the original species of the genus, is represented by three specimens in the Horn collection. A fourth specimen had evidently once been present, but at the time of my visit was not on the "point" nor could I find it in the bottom of the box. There are also two examples in the LeConte collection, evidently a part of the original series taken by Horn in the Owens Valley, California. I have seen no others.

This species is noticeably stouter than *squamosa*, the sides of the thorax less sinuate, more oblique, with the hind angles perceptibly obtuse. The elytral punctures are all very coarse, the interspaces narrower than the punctures even near the suture. The erect scales are short and nearly uniformly strongly capi-

tate clavate, in which respect this species is comparable only with the two following. According to Horn specimens were very rare and were found living with a small black ant under stones. This ant is evidently a different species from others with which *Alaudes* has occurred.

5. *Alaudes fallax* Fall, n. sp.

Oblong-oval, similar in form to *setigera*, with which it agrees in having the point of maximum width of the thorax less close to the apical angles than it is in *alternata* and *squamosa*. The elytral scales are short, uniform throughout, and strongly capitate clavate. The first two or three elytral interspaces are as wide or wider than the adjacent rows of punctures. The prothorax and elytra are sensibly equal in width, and the hind angles of the former with their investing scales are rectangular.

Described from two examples taken by the writer at Pasadena, California, in nests of *Solenopsis geminata mariosa* Wheeler, and bearing dates April 6, 1912, and March 9, 1913. The latter is taken as the type.

This species is closest to *singularis*, differing in its longer anterior arcuation of the sides and rectangular hind angles of the thorax, and in its less coarse elytral striæ with correspondingly wider interspaces. The host ant is a different species.

6. *ALAUDES TESTACEA* Blaisd.

Trans. Am. Ent. Soc., XLV (1919), p. 311

This species is closely allied to the two preceding, with which it agrees in elytral vestiture. The elytra are somewhat shorter and a little more oval than in any of our other species, and are perceptibly wider than the thorax. A few specimens were collected in Alameda County, California, by Dr. Van Dyke, who has kindly sent me a paratype for examination. I do not know whether any of the host ants were secured.¹

For more detailed descriptions of the species known to him see Dr. Blaisdell's paper.

I am indebted to Dr. William M. Wheeler for the identification of the ants mentioned in the present paper.

¹ Note by Dr. E. C. Van Dyke. This host was a species of the acrobat ant (*Cremastogaster* sp.).

NOTES AND DESCRIPTIONS OF NEW SPECIES
OF SCARABÆIDÆ FROM WESTERN
NORTH AMERICA

BY EDWIN C. VAN DYKE

University of California, Berkeley, California

SCARABÆIDÆ

The genus *Aegialia* has a greater number of species on the Pacific Slope than has been supposed, eight in number. *Aegialia rufescens* Horn, I have taken on Mount Rainier, Washington, as well as in the high Sierra Nevada mountains. *A. cylindrica* (Esch.) is found in Alaska near the seacoast, but farther south only along cold-water streams. It extends as far south as San Francisco Bay, and in the Northwest reaches into Idaho and farther east. *A. lacustris* Lec. has been found at Banff, Alberta, and in the eastern part of Nevada County California. *A. blanchardi* Horn or a species so close to it that I cannot separate it, has been taken at Puyallup, Washington; Newport, Oregon, and along the Smith River in Del Norte County, California. *A. conferta* Horn is a streamside species widely distributed from Washington to Ensenada, Lower California. *A. latispina* Lec. is found along many stream margins from Siskiyou to Los Angeles County, and also at Prescott, Arizona. *A. crassa* Lec., our commonest species, is confined to the coast sand dunes and ranges at least from northern Oregon to Carmel, California. *A. pusilla* Horn was described as from Washington, probably Spokane. This list is thus greater by two than that given by Darlington¹ for the New England States.

In the genus *Aphodius* there is a group of large species which are more or less confined to the Pacific Slope and which are quite peculiar both structurally and biologically. To my mind, they form a definite group, but in Horn's Monograph,² three are placed in his Group G and two in Group M, the latter separated from the former by having the fimbriæ at the apex of the hind tibiæ unequal rather than equal. This character, while convenient for the separation of species, often widely removes from one another, as in this case, species which are undoubtedly of the same stock. While not wishing to destroy the usefulness

¹ Psyche 34 (April 1927), p. 99.

² Trans. Am. Entom. Soc. 14 (1887), pp. 23-25.

of Horn's valuable tables, I think that it is best in this case to study these species as a single group and I will so treat them. Besides the species discussed by Horn, there has recently been described one by Fall³ and I will add two, one of which is new, the other one long unrecognized.

The group may be characterized as containing species which are of fair or large size, black and shining; head not tuberculate; prothorax definitely narrowed behind, with a series of coarse punctures rather sparsely and irregularly placed on the disk, and with fine punctures between, the latter sometimes obscure, and with an entire lateral and basal marginal line; the elytra more or less oval, with humeri dentiform, and evidently striato-punctate; the apex of hind tibiae with equal or slightly unequal spinules and the first tarsal segment of hind legs quite long.

Synoptic Key

1. Apex of hind tibiae fimbriate with short equal spinules..... 2
- Apex of hind tibiae fimbriate with unequal spinules, clypeus emarginate at middle, broadly rounded each side..... 8
2. Clypeus angulate or dentate either side of emargination..... 3
- Clypeus emarginate at middle, broadly rounded each side..... 7
3. Clypeus distinctly dentate either side of emargination..... 4
- Clypeus merely angulate each side of emargination..... 6
4. Large species, 9 mm., clypeal emargination three-tenths width of head; prothorax subquadrate, sides almost parallel, base lobed at middle and sinuate either side; elytra oblong; first segment of hind tarsi longer than following three. Lassen County, California*gravis* Fall
- Moderate-sized species, 6-7 mm., clypeal emargination three-eighths width of head; first segment of hind tarsi about equal to next two..... 5
5. Prothorax subquadrate, sides slightly arcuate and narrowed behind, hind angles distinct but rounded, base slightly arcuate; elytra oblong, a third longer than broad. Lassen and east Siskiyou County, California.....*martini* sp. nov.
- Prothorax with sides gradually rounding into base, the hind angles almost obliterated, base arcuate; elytra oblong oval, not a third longer than broad. West Nevada.....*nevadensis* Horn
6. Elliptical yet broad, prothorax subquadrate; first segment of hind tarsi as long as next three. San Francisco Bay region to Placer County, California.....*gentilis* Horn

³ Canad. Entom. 59 (1927), p. 137.

7. Clypeus feebly emarginate at middle, genæ but moderately prominent; larger pronotal punctures only moderately coarse, not numerous and in general confined to sides and basal area; elytra oblong, more than a third longer than broad, striæ well impressed and very distinctly and crenately punctured, intervals slightly convex especially at sides. Oregon and Washington.....*cribratus* Lec.
- . Clypeus distinctly emarginate at middle, genæ prominent; larger pronotal punctures very coarse, umbilicate, fairly numerous toward front as well as at sides and on basal area; elytra oblong, less than a third longer than broad, striæ finely impressed and very finely punctured, intervals flat except ninth and tenth. Lake County, California (probably also Sonoma County).....*cadaverinus* (Mann.)
8. Elytra oblong, striæ moderately deep and coarsely punctured, intervals slightly convex; first segment of hind tarsi as long as next three. Middle and southern California.....*sparsus* Lec.
- . Elytra oval, striæ fine but deep, finely punctured, intervals nearly flat on disk, slightly convex at sides; first segment of hind tarsi longer than next three. Fort Tejon, California.....*ovipennis* Lec.

Aphodius martini Van Dyke, new species

Large, robust, black, antennæ and legs somewhat rufous, moderately shining and not pubescent above. Head without tubercles; occiput finely, rather closely punctured, a few coarse punctures laterally; clypeus finely punctured and rugose, anterior margin moderately emarginate at middle and acutely dentate each side of emargination, sides slightly arcuate; genæ moderately prominent and subacute. Prothorax almost a third broader than long, widest in front of middle; sides slightly arcuate, perceptibly narrowed posteriorly, hind angles evenly rounded, base arcuate, faintly sinuate laterally; basal margin deep, somewhat evanescent near angles; disk convex, sparsely and irregularly punctate with moderately coarse punctures at sides and basal area and with fine punctures intermixed. Elytra oblong oval, a third longer than broad, slightly narrowed at base, the humeri dentiform; disk convex, rather deeply striate, striæ moderately coarsely and closely punctured, intervals convex and very finely punctured. Wings greatly atrophied. Beneath sparsely punctate, the sides of abdomen rugose and pilose. Mesosternum coarsely punctured, obtusely carinate between the coxæ. Posterior femora sparsely, finely punctate; the hind margin of posterior tibiæ fimbriate with short equal spinules; first segment of hind tarsi equal to next two. Sexual characters not distinctive. Length, 6.5 mm.; breadth, 3 mm.

Holotype (No. 2546, Mus. Calif. Acad. Sci.), and several *paratypes* from a series of six specimens in the collection of the California Academy of Sciences, collected by Mr. J. O. Martin

at Martins Springs, Lassen County, California (Sec. 14, T. 31 N. R. 9 E.), September 7, 1922. There are also two other specimens collected at McCloud, California, October 15, 1918, and one from Susanville, Lassen County, California, May 2, 1923, all collected by Mr. Martin. These latter are somewhat smaller, depauperized, and have the prothorax and elytra both more narrowed at base; otherwise not different.

This species which has been confused with *Aphodius nevadensis* Horn, differs markedly from the latter by having a more quadrate prothorax with larger punctures finer and sparser; a different shaped clypeus, narrower and with sides more arcuate; as well as by having the elytra less narrowed at base and the striae more coarsely punctured. It superficially more closely resembles *gentilis* Horn but, aside from the clypeal differences, has much finer pronotal punctures, is narrower and generally less robust, the elytra of *gentilis* not being a third longer than broad, less narrowed at base, and with the humeri much more evidently dentate than in either of the preceding. The first tarsal segment of the hind legs is also evidently longer in *gentilis*.

APHODIUS CADAVERINUS (Mann.)

I have in my collection a specimen of *Aphodius* which I consider to be the true *cadaverinus*⁴ of Mannerheim. It was taken by me in May 1895, near Clear Lake, Lake County California, which is in the same zoögeographical region as Fort Ross, Sonoma County, one of the few places where Eschscholtz collected in California. This species, as Horn states, is no doubt one of the members of his Group G. All of the species listed by me in the preceding table with the exception of *gentilis* Horn, *sparsus* Lec., and the one that I consider *cadaverinus* (Mann.), are restricted to regions which were not visited by Eschscholtz nor by any of the early Russian collectors who supplied the material upon which Mannerheim based his descriptions. None of these species, either, will fit the description, inadequate though it is. Of the three exceptions, *sparsus* Lec. is ruled out by being restricted to the nests of the wood rat, *Neotoma*, and never found as stated in "Trogium instar in cadaveribus exsiccatis," besides it has not the pronotal punctua-

⁴ *Oxyomus cadaverinus* Mann., Bul. Nat. Hist. Soc. Moscow 16 (1843), p. 261.

tion sufficiently coarse to be called variolate, "thorace antierius dilatato varioloso." *Gentilis* Horn does possess the latter character and is to be found under conditions as given for *cadaverinus* (Mann.), but it possesses a type of clypeal emargination which I think Mannerheim would hardly be inclined to describe as "clypeo profunde emarginato." The true *cribratus* Lec. which Horn also lists from California but which I doubt, might possibly be taken for *cadaverinus* (Mann.), but its clypeus is only shallowly emarginate, not profoundly so, and its pronotal punctuation though coarse, not truly variolate. The species, however, which I take to be *cadaverinus* (Mann.), is closely related to *cribratus* Lec., possibly what Horn had seen from California and took to be the same, but it differs decidedly from that by being much broader and more generally robust, with clypeal emargination pronounced, the genæ also more prominent and acute, the pronotal punctures very large and variolate, and the elytral intervals flatter. With the description of *cadaverinus* as given by Mannerheim, it agrees absolutely.

Of the species mentioned above, *gravis* Fall and *sparsus* Lec. have fully developed and functional wings. The first was found by Mr. J. O. Martin high up in the cavity of an old dead tree in what was presumably the nest of a squirrel or rodent of some kind. The second species is always to be found in the upper layers of the manure of wood rats' nests, whether placed well up in the trees or on the ground. All of the other species have the wings much reduced and, so far as I know, have always been found either under cow manure, in old cow yards or under dead herbivorous animals. *Sparsus* is fairly common but all of the other species are very rare.

***Aphodius slevini* Van Dyke, new species**

Small, robust, shining, rufotestaceous, elytra, abdomen and femora testaceous. Head evidently but not markedly trituberculate, the median tubercle vague, occiput moderately coarsely punctured; clypeus slightly gibbous at middle, rugose-punctate, anterior margin rather deeply emarginate, with a distinct though short denticle on each side of emargination which is turned upward, sides feebly sinuate, genæ rounded and not prominent. Prothorax one-fourth broader than long, sides feebly arcuate and gradually narrowing to front, margin not explanate, scarcely fimbriate, hind angles obtusely rounded, base regularly arcuate and with fine marginal line; disk quite convex, sparsely punctured with coarse and fine punctures

intermixed, the punctures coarser and closer laterally. Elytra one-fourth longer than broad, as wide at base as prothorax, the humeri obtuse, sides feebly arcuate; disk quite convex, finely striato-punctate, intervals flattened and with a few minute punctures. Body beneath sparsely punctate, the abdomen alutaceous. Mesosternum not carinate. Anterior tibiæ smooth in front, tridentate externally, first segment of tarsus shorter than second. Posterior femora with a few vague punctures near knee, the tibiæ with hind margins fimbriate with short unequal spinules, the first tarsal segment slightly longer than the following two. Length, 4 mm.; breadth, 2 mm.

Holotype (No. 2547, Mus. Calif. Acad. Sci.), a unique female, collected by Mr. L. S. Slevin, at **Carmel, Monterey County, California**, November 15, 1915, and now in the Slevin collection of the California Academy of Sciences.

This interesting little species which because of its robustness has somewhat the facies of an *Aegialia*, would come in the series 1-C of Horn's paper after *militaris* Lec. and *æmulus* Horn, from both of which it differs by its more testaceous color, smaller size and greater robustness, rugose clypeus, and double type of pronotal punctuation.

Atænius cribratus Van Dyke, new species

Form elongate, parallel, but moderately convex, rufopiceous, beneath lighter and more rufous, antennæ and palpi rufotestaceous, slightly shining. Head coarsely, densely punctured posteriorly; clypeus rugulose, anterior margin broadly and distinctly emarginate, a distinct angulation or minute denticle each side, sides arcuate, genæ moderately prominent and obtuse. Prothorax about one-third broader than long, slightly narrower posteriorly, sides feebly arcuate, hind angles rounded, base arcuate, basal marginal line distinct, lateral and basal margins crenulate and finely fimbriate; disk moderately convex, with slight depression near anterior angles, coarsely, closely and cribrately punctured, finer in front. Elytra as wide as prothorax, humeri markedly dentiform, sides nearly parallel, striæ deep and narrow, finely obscurely punctured, intervals broad and subcarinate, their sides obliquely declivous, with a row of pronounced punctures on either side close to striæ, the margins as a result slightly crenulate. Mesosternum opaque, finely punctate-granulate, carinate between the coxæ. Mesosternum coarsely, sparsely punctured at middle, more rugose and finely at the sides. Abdomen coarsely punctured throughout. Anterior tibiæ tridentate externally and feebly crenate above. Posterior femora sparsely, rather coarsely punctate, with at most a feeble trace of a marginal line near the knee; posterior tibiæ without accessory spinule; the first tarsal segment about equal in length to the long spur. Length, 4 mm.; breadth, 1.8 mm.

Holotype (No. 2548, Mus. Calif. Acad. Sci.), collected by Mr. J. O. Martin, July 29, 1924, at **San Xavier Mission**, near Tucson, **Arizona**. Three *paratypes* taken at the same time and place by Mr. E. P. Van Duzee, in the collection of the California Academy of Sciences.

This interesting species should be placed before *Atænius abditus* Hald. where it would run in Horn's table. It differs from this by being larger, by having the pronotal punctures coarser and closer, the elytral striæ not distinctly punctured as in *abditus* but with the pronounced punctures on the flanks of the intervals. It is not closely related to any of our species, but is no doubt near *Atænius sculptifrons* Bates but differs in lacking the longitudinal rugæ of the forehead and the smooth impressed line on the pronotum.

Atænius carolinus Van Dyke, new species

Small, elliptical, slightly elongate, moderately convex, black, front of head, tibiæ, and tarsi rufous, antennæ and palpi rufotestaceous. Head moderately convex; occiput rather coarsely, closely punctured; front and clypeus impunctate, subopaque, clypeal margin broadly, somewhat triangularly emarginate, an acute denticle, somewhat elevated at apex, on each side, the sides but slightly arcuate; genæ moderately prominent, obtuse. Prothorax about one-fifth broader than long, sides feebly arcuate, apex just perceptibly narrower than base, hind angles obtuse and rounded; base arcuate at middle, faintly sinuate at sides, basal margin neither crenulate nor fimbriate; disk rather coarsely, not closely punctured at middle, more densely and closely at sides, the punctures finer anteriorly. Elytra elongate oval, one-third longer than broad, the base as wide as base of prothorax; humeri indistinctly dentate, sides slightly arcuate; disk deeply striate, the striæ distinctly crenulately punctured, intervals convex, slightly flattened near suture. Mesosternum opaque, densely and finely punctured, a slight carina between the coxæ. Metasternum coarsely, not closely punctured. Abdomen feebly shining, impunctate except along anterior border where it is punctate-crenate. Anterior tibiæ acutely tridentate externally, slightly crenate above. Posterior femora smooth, the posterior marginal line evident near knee, vague at middle; tibiæ with accessory spinule a mere dentation; first tarsal segment about equal to the long spur. Length, 2.75 mm.; breadth, 1.50 mm.

Holotype (No. 2549, Mus. Calif. Acad. Sci.), and one *paratype* collected by myself in the **Black Mountains of North Carolina**, June 1901.

This very small species somewhat suggests a diminutive

A. cylindricus Horn, but lacks the close pronotal punctuation and complete marginal line to posterior femora. Being without a well-defined accessory spinule to hind tibiæ and without a deep and complete marginal line to the posterior femora, it would come near *abditus* Hald. in Horn's table of species. It might best fit in just before *desertus* Horn.

Atænius semipilosus Van Dyke, new species

Slightly elongate, elliptical, moderately convex, dark rufous, legs lighter, antennæ and palpi rufotestaceous. Head moderately convex, occiput rather finely, sparsely punctured; front smooth, sides of clypeus obscurely rugose, clypeal margin broadly emarginate, obtusely, not sharply arcuate; genæ moderately prominent, obtuse. Prothorax less than one-third broader than long, slightly narrowed in front; sides moderately arcuate, hind angles obtuse and rounded; base evenly arcuate, basal marginal line distinct, lateral and basal margin finely fimbriate, not crenulate; disk coarsely, not closely punctured, finer in front. Elytra elongate oval, three-sevenths longer than broad; base slightly narrowed and narrower than base of prothorax, humeri inconspicuously dentate; sides moderately arcuate; disk deeply striate, the striæ finely, not closely punctured, intervals very convex and with a series of fine but distinct punctures on each side, close to the striæ, from which arise rather short and fine erect setæ, less evident near base (probably abraded). Mesosternum opaque, densely and finely punctured, a slight carina between the coxæ. Metasternum coarsely and sparsely punctured, more shallowly laterally. Abdomen coarsely and sparsely punctured, punctures finer at middle. Anterior tibiæ acutely tridentate externally, obscurely crenate above. Posterior femora smooth, the posterior marginal line absent; tibiæ with distinct accessory spinule; first tarsal segment as long as the following four segments but slightly shorter than the long spur. Length, 3.25 mm.; breadth, 1.15 mm.

Holotype (No. 2550, Mus. Calif. Acad. Sci.), a single specimen, collected by Prof. W. M. Wheeler at **Texas Pass, Dragon Mountains, Arizona**, July 19, 1917, and kindly presented to me. A second specimen, somewhat injured, collected by Mr. C. T. Dodds at Los Mochis, Sinaloa, Mexico, June 1922, is in the California Academy collection. This latter I will designate as a paratype.

This species superficially looks much like *Atænius desertus* Horn, and the second specimen was mixed with a series of these. The single type of pronotal punctuation and the presence of a distinct accessory spinule will, however, readily separate this from *desertus*. Structurally, this species is very close to

Atenius hirsutus Horn, but it differs by being smaller, rufous not piceous, by having the sides of the clypeal emargination angulate not rounded, the pronotal punctuation not of the double type, and the elytra less densely pilose. In Horn's table it would come perhaps best, just before *læviventris* Horn.

ACOMA Casey

This genus⁵ was established by Colonel Casey for the reception of a single species, *brunnea* Casey, and the characterization was, therefore, limited by this species. In the collection of the California Academy of Sciences there are two other species which are undoubtedly congeneric with *brunnea* but which differ in several features such as the clypeus and antennæ. Inasmuch as these structures were used in the generic description, this will now have to be somewhat modified. All of the specimens of *Acoma* which I have seen, and I have seen many *brunnea*, are males, and most of these have been taken at light. From this I am inclined to believe that the females are either wingless or are very limited in their activities as is the case with *Pleocoma*, near which they are now rightfully placed. The finding of two other species of *Acoma* in Lower California also throws some light on their distribution and seems to indicate that this genus and probably also *Pleocoma* came from the south and that we will have to look to either Central or South America, probably the west coast, for the more generalized relatives of these.

Synoptic Key

1. Antennal club of male formed of five lamellæ; clypeus very broadly margined and reflexed, rufopiceous; length 8-10 mm.
.....*robusta* sp. nov.
- Antennal club of male formed of but three lamellæ; clypeus but moderately margined and reflexed..... 2
2. Prothorax with sides almost parallel posteriorly, gradually convergent forward; elytral striæ not sharply defined, rufopiceous; length 6-6.5 mm.....*confusa* sp. nov.
- Prothorax with sides broadly, somewhat angulately arcuate, broadest at middle; elytral striæ always more or less distinctly defined, rufocastaneous; length 5.5-7 mm.....
.....*brunnea* Casey

Acoma robusta Van Dyke, new species

Large, robust, elongate, the sides nearly parallel, quite convex, shining; front and side margins of prothorax, elytra, legs, and under-

⁵ Anns. N. Y. Acad. Sci. V (February 1890), p. 165.

side clothed with rather long fulvous hair, the body rufopiceous. Head with occiput smooth; front rugose and opaque above, punctate-rugose in front and slightly concave; clypeus with a very broad and reflexed margin extending back to eyes, the anterior edge slightly emarginate, the sides oblique and almost straight, parallel in front of eyes; antennæ with the club formed of five long lamellæ. Prothorax three-fourths as long as broad, broadest at middle, apex deeply emarginate, front angles prominently projecting and subacute; sides sinuate just behind anterior angles, thence arcuate to base which is two-sevenths broader than apex and moderately arcuate, hind angles obtusely rounded; base finely margined, apex more broadly so; disk rather coarsely, somewhat closely punctured, a smooth longitudinal area at middle and an inconspicuous callosity near middle of sides. Scutellum impunctate except in front where vaguely punctured. Elytra one-fourth longer than broad, just perceptibly widest at middle, moderately narrowed posteriorly; humeri slightly prominent and well rounded; disk with striæ distinctly impressed, fairly well defined above, interrupted and less distinctly defined at sides, irregularly punctured, the striæ slightly convex, third and fifth somewhat narrower, smoother and more elevated, the others broader, flatter and irregularly coarsely punctured; the rather long, semirecumbent hairs arising from both strial and interstrial punctures. Beneath rather coarsely, closely punctured at sides, smoother and more finely and sparsely punctured at middle and clothed with long silky hair. Length, 10 mm.; breadth, 4.5 mm.

Holotype (No. 2551, Mus. Calif. Acad. Sci.), collected by Prof. G. F. Ferris at **Triumfo, Dist. Sur., Lower California**, July 8, 1919, and four *paratypes* taken by Mr. J. R. Slevin at La Paz, Lower California, June 28, 1919.

This large and robust species is easily distinguished from *brunnea* not only by its greater size, but by its more pronounced convexity, piceous brown color, antennæ with five segmented club, and coarser punctuation of upper surface.

***Acoma confusa* Van Dyke, new species**

Rather small, slightly elongate, subparallel, moderately convex, shining; front and sides of prothorax, elytra, legs and underside clothed with moderately long grayish pile, the body rufopiceous. Head with occiput (generally concealed) smooth; front rugose and opaque, flattened; clypeus concave at base, with a moderately broad and reflexed margin, the apical margin acutely (holotype) or moderately (paratype) emarginate, the sides oblique and but slightly arcuate to eyes; antennæ with the club formed of three long lamellæ. Prothorax one-third broader than long; apex moderately emarginate; front angles moderately prominent, hardly projecting forward and subacute; sides almost straight and obliquely diverging from front

angles to middle, quite parallel behind; base one-third broader than apex and moderately arcuate, hind angles obtusely rounded; base and apex finely margined; disk distinctly and rather finely, not closely punctured; a smooth longitudinal area at middle, with a finely impressed line at basal two-thirds and an inconspicuous callosity near middle of sides. Scutellum impunctate and slightly sulcate. Elytra two-sevenths longer than broad, widest at middle, gradually narrowed posteriorly; humeri slightly prominent and rounded; disk with striæ not distinctly defined, the stria and interstria punctures rather coarse, close, and somewhat irregularly scattered, the surface also somewhat rugose, with moderately long semi-erect hairs arising from each puncture. Beneath rather coarsely, closely punctured and clothed with rather long cinereous hair. Length, 6 mm.; breadth, 2.5 mm.

Holotype (No. 2552, Mus. Calif. Acad. Sci.), collected by Mr. E. P. Van Duzee at Coronados Island, Gulf of California, May 18, 1921. One *paratype* (somewhat crushed) collected by Mr. I. M. Johnston at Loreto, Lower California, May 20, 1921.

This small species is about the size of one of the smaller *brunnea*, and has the same three-segmented antennal club, though the lamellæ composing it are but two-thirds the length of those in *brunnea*. It also differs by having the clypeus more narrowed in front, the prothorax more narrowed, with sides not rather evenly arcuate, the discal punctuation coarser and slightly more numerous, the elytra less regularly sculptured, and the color, as in the preceding species, a reddish brown, not rufocastaneous. The name *brunnea* is rather unfortunate, for the species which bears it is the only species of the three which is not truly brown.

AMPHICOMA Latr.

Field observations continued for a long series of years, seems to prove that we have but four good species of *Amphicoma* in this country: *lupina* (Lec.) and *vulpina* Hentz., the two eastern species; and *ursina* (Lec.) and *rathvoni* (Lec.), the two Pacific species. The two eastern species seem to be fairly stable as to color, but our two Pacific species are decidedly unstable, both being dichromatic as well as variable otherwise. The well-known *ursina* (Lec.) of the San Francisco sand dunes is usually a yellowish gray, but every now and then an absolutely black phase is to be found, flying and mating with the others. The other species, which is generally to be found about the sandy margins of lakes and streams, is normally dichromatic,

the black and lighter phases being found in about equal numbers. In middle California as in Napa and Sonoma counties, the true *rathvoni* (Lec.) is generally, I might say always, associated with typical *canina* (Horn). In the Sierras and in southern California, the subspecies *edwardsi* (Horn) replaces *rathvoni*, but as in the north, is associated there with *canina*. *Cooperi* (Horn) is more of a subspecies than a color phase, for it as a rule replaces *canina* in certain localities. I might also state that the black phases, *rathvoni* and *edwardsi*, as well as the light phases, *canina* and *cooperi*, may be of either sex. They also all vary considerably as to minor details of coloration in different regions.

Glaresis clypeata Van Dyke, new species

Moderately robust, somewhat elongate and subparallel, reddish brown. Head convex, front obscurely tuberculate, not impressed; clypeus with anterior margin truncate and distinctly serrate, the sides projecting obliquely outward, and obliquely truncate and serrate at apex, the galæ prominent, lobed and with margins indistinctly crenulate; the mandibles not sinuate externally. Prothorax about a fourth broader than long, sides almost straight and slightly converging forward to rounded front angles, lateral margin crenulate; disk with apical marginal groove wanting, median groove present though faint, no other discal impressions, the linear, granular tubercles numerous and distinct though minute. Elytra with striæ broad and distinctly though shallowly impressed and coarsely, rather closely punctured, the intervals well elevated, subcostiform and with the usual line of short, suberect setæ. Outer apical angle of middle tibiæ prominent and acute; outer margin of hind tibiæ but slightly emarginate before the apex. Length, 4.75 mm.; breadth, 2.25 mm.

Holotype (No. 2553, Mus. Calif. Acad. Sci.), a unique, collected by myself at **Carrville, Trinity County, California**, June 7, 1913.

This very distinct species would run in Fall's synoptic table⁶ of *Glaresis*, to *phœnicis* Fall. It is, however, much larger than *phœnicis*, as large as *ecostata* Fall, has the elytral striæ more distinctly punctured, the clypeus with a well-marked serrate margin, simple in the other, and the mandibles not toothed externally. I find the small spine of the hind trochanter as mentioned by Fall, but no spiniform teeth near the middle of the posterior-superior margin of the hind femora.

⁶ Psyche 14 (1907), p. 25.

TWO NEW SPECIES OF CÆLOCNEMIS
(COLEOPTERA: TENBRIONIDÆ)

BY FRANK E. BLAISDELL, SR.

The two new species described below are unique additions to our list of species of *Cælocnemis*. They are quite different from any form described by Colonel Casey in his recent revision, published in the *Memoirs on the Coleoptera*, XI, 1924.

Cælocnemis barretti Blaisdell, new species

Form robust, resembling *Eleodes consobrina* Lec., a little more than twice as long as wide. Color black, dull and opaque in luster. Golden pubescence of the tibiæ and tarsi as usual.

Head about as long as wide, equal to the pronotal apex; sides arcuate before the eyes, thence straight and moderately convergent to the clypeal apex, the latter sinuato-truncate, angles rather narrowly rounded. Front flat, somewhat irregularly impressed, suture more or less evident; rather finely, quite densely punctate, punctures small, more widely separated in the central area. Antennæ as long as the pronotum; feebly incrassate, seventh joint triangular, 8 to 11 transverse.

Pronotum about one-fifth wider than long, apex sinuato-truncate in moderate circular arc; sides obtusely angulate at about basal third, thence very feebly arcuate and convergent to the obtusely rounded apical angles, posteriorly convergent and broadly, feebly sinuate, becoming very briefly parallel before the rectangular basal angles, that are not in the least prominent; lateral marginal bead fine, thin and feebly reflexed anteriorly; base truncate in feeble circular arc; disk evenly and moderately convex, densely and quite evenly punctate; punctures small, slightly larger than those of the head.

Elytra about a half longer than wide, somewhat evenly but not strongly inflated, widest at about the middle, base transverse, about equal to the pronotal base; scutellum very small and triangular; humeri obtuse; sides broadly and rather evenly arcuate, obtusely rounded at apex; disk quite evenly convex, rapidly and arcuately declivous apically, feebly flattened in the central area; surface ruguloso-punctate, striæ of rather widely spaced punctures which are more or less distinct and larger than the interstitial punctures.

Legs rather short, somewhat slender; anterior femora stouter than the others; hind femora straight and three-eighths longer than the tarsi.

Abdomen somewhat shining, smooth and more or less distinctly ruguloso-punctate.

The sexes are quite similar in form: Male has the abdomen slightly oblique to the sternal plane and noticeably flattened in the central area of the first three segments. In the female the abdomen is horizontal and more convex.

Measurements. (Types.) Length 18.5 to 19.4 mm.; width 8 mm. Five specimens studied. Largest specimen a female, length 22 mm.; width 9.5 mm.

Holotype, female, No. 2554, and *allotype*, male, No. 2555, deposited in the collection of the California Academy of Sciences. Mr. Barrett retains three *paratypes* in his collection.

Type locality, **Bear Canyon**, Sierra Madre Mountains, **Los Angeles County, California**, collected on December 31, 1926, by Mr. Ralph Barrett, to whom the species is dedicated in recognition of his keenness in collecting.

Barretti differs from all of the other species by its short robust form and peculiar dull luster. In larger specimens there seems to be a tendency to become more elongate, as shown in the large female mentioned above. The species possesses a marked resemblance to *Eleodes consobrina*, which occurs in the same geographical region. A homologous type occurs in northern California in the vicinity of Shasta City; it is much less robust, more depressed and shining and of a different species.

Cœlocnemis tanneri Blaisdell, new species

Form elongate oval, about two and two-thirds as long as wide, not in the least robust, rather strongly convex. Color dull black throughout.

Head three-fourths as wide as the pronotum, widest across the preocular arcuation; sides of the front straight and moderately convergent to the epistomal apex, the latter subtruncate, angles obtuse and rather narrowly rounded; front vaguely and broadly impressed along the frontal suture and internally before the eyes; surface obsolete, minutely, evenly and moderately closely punctate. Antennæ moderate in length, about attaining the pronotal base, slender, slightly and very gradually incrassate in the distal five joints, the latter slightly compressed, last four slightly transverse; eleventh largest, fifth and sixth subequal in length and together as long as the third, second small and annular, third to the sixth inclusive quite cylindrical, the fourth distinctly longer than the fifth.

Pronotum about as wide as long, widest just before the middle; apex truncate in circular arc; sides moderately arcuate anteriorly, oblique and convergent to base, feebly and broadly sinuate before the basal angles, the latter small and subrectangular, marginal bead fine and not distinctly marked; apical angles rather broadly rounded; base transverse, more strongly beaded; disk evenly and rather strongly convex, arcuately declivous at the angles, most so anteriorly, finely, rather closely and somewhat distinctly punctate, punctures slightly denser laterally.

Elytra oval, about twice as long as wide, widest a little behind the middle; moderately convex on the dorsum, strongly and evenly rounded laterally, obliquely and arcuately declivous posteriorly, apex moderately narrowly rounded; disk feebly sculptured, eight striæ of small, slightly elongate punctures, which are not in the least impressed, intervals flat and very finely punctulate, surface obsoletely rugulose.

Abdomen slightly oblique to the sterna, moderately convex, broadly impressed along the middle third, finely but not densely punctato-rugulose. Fifth segment with a feeble submarginal apical groove. Legs long and quite slender, obsoletely sculptured; tibiæ fulvo-pubescent within as usual; tarsi similarly clothed beneath; meso- and metatibiæ straight, protibiæ slightly arcuate.

Measurements. Length, 16.6 mm.; width, 6 mm.

Type, a unique male, No. 2556, in the collection of the California Academy of Sciences.

Type locality, **Zion's Canyon, Utah**. Collected on June 10, 1924, by Vasco M. Tanner. I take pleasure in naming the species after its discoverer.

Tanneri belongs with those species that have the pronotal sides broadly rounded. It is distinctly different from *punctata* Lec., which also occurs in Utah according to Colonel Casey; my own series of which was collected in Nevada. In *punctata* the punctuation is distinct, the prothorax wider than long. *Utensis* Casey has the prothorax wider than long, widest behind the middle and the punctuation is strong, deep, and close-set. *Spaldingi* Casey has pronotal characters like those of *utensis*, but the basal angles are acute and everted; both occur in Provo Canyon, Utah, and there is reason to believe that they are one and the same species but no specimens are at hand to prove it. In *tanneri* the prothorax is about as long as wide, widest just before the middle and the sculpturing is quite obsolescent throughout.

DICHELONYX PALLENS Lec.

According to the field observations of Mr. E. R. Leach, *Dichelonyx longiclava* Fall is but the male of *D. pallens* Lec. Not only are all *longiclava* males and all *pallens* females, but they are restricted to the same general regions, the chaparral-covered hills of middle and northern California. In one case Mr. Leach secured a pair actually in copulation.—E. C. Van Dyke.

THREE NEW SPECIES OF RHAPHIUM (DIPTERA)

BY M. C. VAN DUZEE

Buffalo, New York

Rhaphium obtusum Van Duzee, new species

Male: Length, 5 mm. Face wide, its sides parallel, viewed obliquely appearing gray or whitish, seen from in front more slate-colored; front opaque with grayish brown pollen; palpi black with numerous black hairs; antennæ black, first joint with bristles above and below; third joint about twice as long as width of base, somewhat triangular; arista apical, scarcely as long as the antenna; beard white, not abundant.

Dorsum of thorax blue, posterior part and scutellum more green, the whole covered with thick gray pollen, the bristles inserted in minute black dots; scutellum with two pair of long bristles; dorsum of abdomen shining green, covered with stiff black hairs and white pollen which is more conspicuous at base of the segments; posterior part of segments more blackish on the middle. Hypopygium black; outer appendages small, black, somewhat rounded at tip, covered with pale hairs; inner appendages large, lamella-like, extending far beyond the outer lamellæ and appearing like an extension of the hypopygium when viewed from the side; central filament stout, black not reaching the tip of the inner appendages.

Coxæ and femora black, tips of fore and middle femora yellow, trochanters black; fore coxæ with black, bristly hairs on anterior surface; middle coxæ without a distinct spur, but the long stiff hairs on the front surface extend down beyond their tips, forming a small obscure spur; all femora with black bristles on the whole of their lower surface, those on middle ones longest; all tibiæ yellow, posterior very narrowly black at base and quite broadly so at tip; all tibiæ with short hair, the bristles on upper surface large, middle pair with several very minute ones below; fore and middle tarsi black from the tip of the first joint, the posterior wholly black; all tarsi plain; joints of fore tarsi as 48-11-10-7-10; of middle ones as 56-19-14-9-9; joints of posterior ones as 40-29-20-12-12. Calypters white with a black tip and yellow cilia; knobs of halteres white.

Wings a little grayish; first vein reaching halfway to tip of second; third vein only a little bent back at tip; last section of fourth vein bent at basal third, parallel with third at tip, ending in the apex of the wing; cross-vein 28, last section of fifth vein 50 fiftieths of a millimeter long.

Type, male, No. 2557, Mus. Calif. Acad. Sci., taken by E. P. Van Duzee, June 27, 1927, at Reno, Nevada; one *paratype* was taken at the same time and place.

This would run to *terminalis* in Mr. Curran's table of species

(Trans. Royal Canadian Institute, Toronto, Vol. XV, p. 253, 1926). It differs from that species in having very short outer hypopygial appendages, while in that species the outer appendages are very long and slender.

Rhaphium calcaratum Van Duzee, new species

Male: Length, 2.5 mm. Face rather wide, narrowest below, brown when seen from in front, white when viewed obliquely; antennæ black, third joint somewhat conical in outline, one and a half times as long as wide; arista twice as long as the third joint; palpi and proboscis black; front and occiput blackish; lateral and inferior orbital cilia and the beard white.

Thorax, scutellum and abdomen dark green, the latter with slight coppery reflections and short black hair on dorsum; hair on the sides long and white; the thin brownish pollen on the dorsum of the thorax leaving shining lines along the rows of bristles. Hypopygium black, nearly round; outer appendages rather long filaments that are a little bent at tip, fringed with hairs and about as long as the width of the hypopygium; inner appendages a pair of stouter filaments; straighter and stouter than the outer ones with only a few very short hairs, placed on each side of the tip of the hypopygium.

All coxæ, fore and middle femora, apical half of posterior femora and the whole of posterior tibiæ and tarsi black; basal half of hind femora and fore and middle tibiæ yellow, fore and middle tarsi black from the extreme tip of first joint; hairs on fore coxæ white; middle coxæ without a spur; first joint of fore tarsi swollen below on basal half; first joint of middle tarsi a little enlarged at tip; joints of fore tarsi as 15-8-5-5-6; of middle ones as 29-11-10-7-6; joints of posterior tarsi as 25-23-15-10-9. Calypters and halteres yellow, cilia of the former white.

Wings grayish; third and fourth veins parallel toward their tips, fourth ending in the apex of the wing; last section of fifth vein 36, cross-vein 10 fiftieths of a millimeter long.

Described from one male in the author's collection, taken at Ithaca, New York.

Rhaphium fuscicosta Van Duzee, new species

Male: Length, 5 mm. Face narrow, silvery white; front green, dulled with white pollen; palpi black with white pollen and long, flattened, silvery white hairs on apical part; proboscis black; antennæ black, width of third joint is as 11, length as 40, length of arista as 43; upper orbits with a few short black cilia, no cilia on lateral and inferior orbits; beard very short, white, a few white bristles below the head.

Thorax and scutellum green with bronze reflections, slightly dulled with white pollen. Abdomen blue-green, more blue posteriorly, base

of segments blackish; hairs on dorsum of abdomen black, on the sides long, stiff and yellowish white. Hypopygium black, outer appendages long brown filaments fringed with long hairs; inner appendages very large thin lamellæ, a little longer than the outer filaments ($\frac{1}{2}$ mm. long), about twice as long as wide, broadly rounded at apex, whitish, blackened at base.

Coxæ black, anterior pair with green reflections; fore and middle coxæ with long, dense, silvery white hair, the latter with a large black thorn at tip; fore femora, except tip, a broad ring on apical half of middle femora, most of apical half of posterior femora and the trochanters black; remainder of middle and hind femora, the whole of fore and middle tibiæ and basal three-fifths of posterior tibiæ yellow; apical two-fifths of hind tibiæ and all tarsi black, base of fore and middle tarsi slightly yellowish; fore and middle femora with long pale hairs below; posterior femora with a few long pale hairs at base above, none below; hind tibiæ thickened on apical part; middle tarsi with the second, third and fourth joints slightly widened; joints of fore tarsi as 34-10-7-6-8; of middle ones as 55-23-17-10-9; those of posterior pair as 51-20-16-10-10. Calypters yellow with black tips and white cilia; halteres pale yellow.

Wings grayish, costal margin blackish from just before the tip of first vein to tip of third vein and from the costa to third vein; apical part of wing beyond the cross-vein and back to fourth vein tinged with brown; third vein bent back at tip; last section of fourth vein bent at its middle, parallel with third at tip, reaching the wing margin just before apex of wing; last section of fifth vein 56, cross-vein 28 fiftieths of a millimeter long.

Described from one male in the author's collection, taken by him, June 16, 1924, at Little Valley, New York.

This is something like *banksi* Van Duzee, but in that species the large lamellæ are the outer appendages, in this they are the inner ones. It is still more like *insolitum* Curran, but the outer appendages in that form are much broader at base, being triangular, not filaments as in this; the beard in that species is very abundant and long, in this it is short and not very abundant.

Obtusum new species also comes in this group of four species having large hypopygial lamellæ; *fuscicosta* and *insolitum* have the basal half of hind femora yellow, apical half black; *banksi* and *obtusum* have all femora wholly black, except at tip; in *banksi* the large lamellæ are whitish tinged with brown and black at extreme tip, in *obtusum* the lamellæ are black at base, slightly testaceous or yellowish at tip, they are also of a different form.

THREE NEW APHIDS FROM UTAH*

BY GEORGE F. KNOWLTON
Agricultural Experiment Station
Logan, Utah

Macrosiphum packi¹ Knowlton, n. sp.

This large, rather shiny, bluish green to apple-green aphid² is quite generally distributed over Utah, feeding upon the common rabbit brush (*Chrysothamnus nauseosus*). The colonies are usually small and located on the leaves well out toward the tips of the twigs. Most forms collected have been apterous viviparous females and nymphs, though one pupal nymph has been taken.

Stem mother. Similar to the summer apterous females but darker green and often larger, reaching a length of 3.6 mm. in some cases.

Apterous viviparous female. Size, 3 to 3.25 mm. long; rostrum reaching second coxa; head armed with elongate hairs, enlarged at the tip; ocular tubercles rudimentary or lacking; antennal tubercles rather prominent and diverging; antennal I gibbus on inner surface; antennæ black except I, II, and base of III which are green; body armed with numerous capitate to fan-like hairs; antennal III, 0.80 mm. long and armed with three to nine oval sensoria arranged in an irregular to scattered row on basal one-half to two-thirds of segment: IV, 0.8 mm.; V, 0.65 to 0.67 mm.; VI, 1.24 to 1.54 (0.14 + 1.1 to 1.4) mm.; legs rather long; lateral tubercles lacking; cornicles slender, 1.17 mm. long, without closed reticulations, usually curving slightly outward near distal end, moderately swollen before the flange which is not preceded by a constriction; cauda elongate, with four or five hairs on each side and two on dorsal surface near end.

First collected at Cove Fort, Utah, on July 7, 1925. Other collections were made at Aurora, Axtell, Fruita, Lehi, Loa, Milford, Richfield, Salina (May 7), Scipio, Sigurd, St. John, Teasdale, Tooele, and Torry, Utah.

The cotypes may be found in the collections of the United States National Museum, Utah Agricultural Experiment Station, and in the collection of the writer.

Aphis sorenseni³ Knowlton, n. sp.

The winged form of this greenish black aphid⁴ was collected

* Approved for publication by Director, June 23, 1927.

¹ Dr. H. J. Pack, Entomologist, Utah Agricultural Experiment Station.

² The writer wishes to thank Dr. C. P. Gillette and Miss M. A. Palmer for their opinions concerning this form.

³ C. J. Sorenson, Assistant Entomologist Utah Agricultural Experiment Station.

⁴ The writer wishes to thank Dr. E. M. Patch for her opinion concerning this form.

at Providence, Utah, July 18, 1925, where it was feeding upon the leaves of willow (*Salix lutea*).

Winged viviparous female. Size, 1.55 mm. long; rostrum barely reaching second coxæ; antennæ black and armed with pointed hairs; antennal III, 0.36 mm. long with twenty-five to thirty oval sensoria scattered over the segment; IV, 0.23 mm.; V, 0.2 mm.; VI, 0.46 (0.11 + 0.35) mm.; prothoracic tubercles prominent; legs of moderate length; wing venation typical, veins slightly dusky, second branch of M arising slightly nearer to margin of wing than to the first branch; abdomen bluish green with a prominent lateral tubercle on each side posterior to the cornicles; cornicles black, 0.25 mm. long, cylindrical, covered with broken reticulations and ending in a moderate flange; cauda black, constricted near base with four to five hairs on each side and one on dorsal surface near distal end.

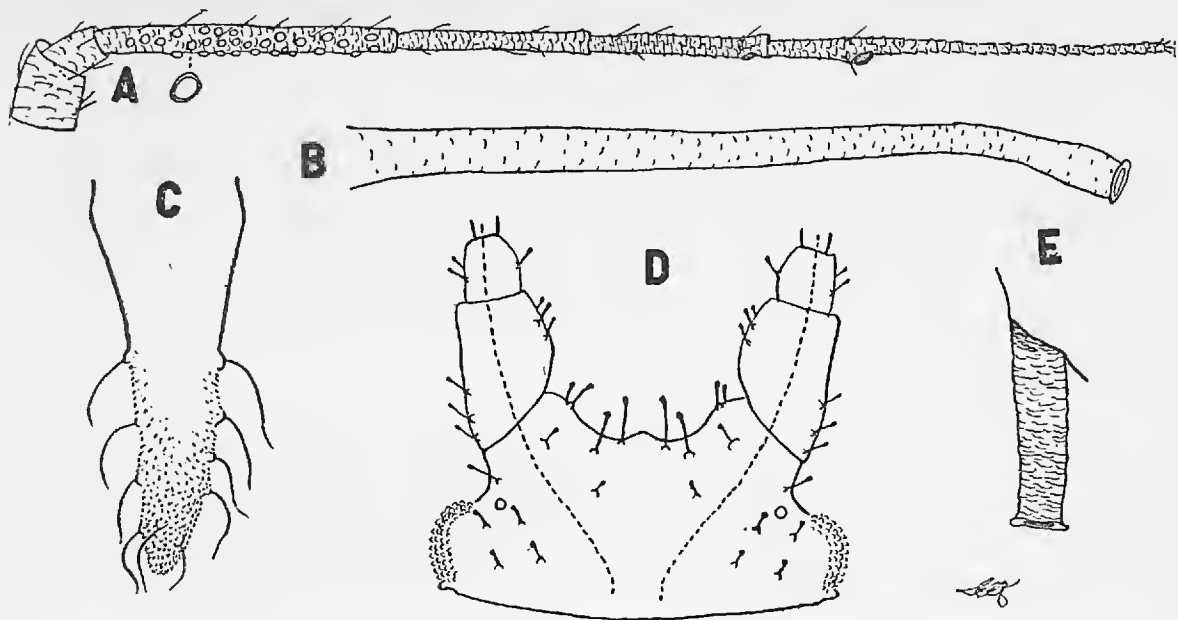
Type in the collection of the writer.

Neomyzus masoni Knowlton, n. sp.

This bluish green aphid was rather common on young sunflowers (*Helianthus annuus*) at St. George, Utah, on July 9, 1925. The aphids were present on the younger leaves and tip growth, in some cases in such numbers as to cause wilting. Many were also present on the underside of older leaves. Migration was occurring at this time, and winged forms were found on many other plants. These forms would take flight on very slight disturbance.

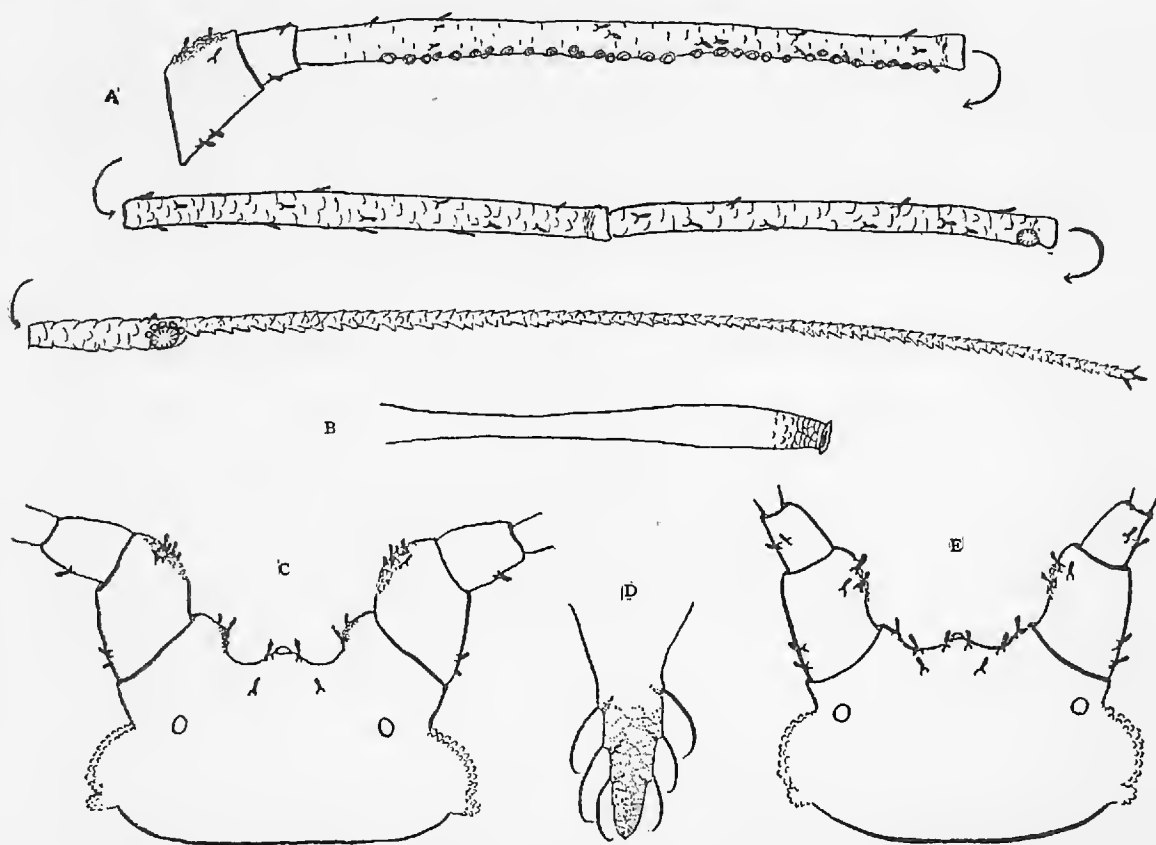
Dr. P. W. Mason called the writer's attention to the resemblance of this form to *Amphorophora corylina* (Davidson) from which it differs principally in having more slender, elongate cornicles, and the *Myzini* character of slightly gibbus inner surface of the first antennals which extends to the inner surface of the antennal tubercles of the apterous forms.

Alate vivipara. Color bluish green to yellowish green; size, 2 mm. long; rostrum reaching second coxa, blackish at tip; head and antennæ armed with short finger-like hairs often enlarged toward tip; antennal tubercles prominent; antennal segments I, II, and base of III greenish, rest blackish to black; antennal I slightly gibbus on inner side; III, 0.71 to 0.78 mm. long with twenty-five to thirty sensoria in irregular row; IV, 0.51 to 0.56 mm.; V, 0.55 to 0.57 mm.; VI, 1.42 (0.17 + 1.25) mm.; legs rather long; wing venation typical with brownish black veins and second branch of media arising slightly nearer margin of wing than to first branch of media, and with a long narrow stigma; cornicles 0.70 to 0.75 mm. long, attachment greenish black, blacker at tip where there are a few rows of



Explanation of Figure 1

A, *Aphis sorenseni* n. sp., antenna of alate viviparous; B, *Macrosiphum packi* n. sp., cornicle of apterous viviparous; C, *M. packi* cauda of apterous viviparous; D, *M. packi*, head of apterous viviparous; E, *A. sorenseni*, cornicle of alate viviparous.



Explanation of Figure 2

Neomyzus masoni n. sp. A, antenna of alate viviparous; B, cornicle of alate viviparous; C, head of apterous viviparous; D, cauda of alate viviparous; E, head of alate viviparous.

closed reticulations before the flange; cauda elongate, cone-shaped, constriction near base very slight to lacking.

Apterous vivipara. Color bluish green to pale green; body 2.12 mm. long; antennal tubercles and first antennal slightly gibbus on inner surface; antennæ blackish to black; antennal III, 0.8 mm. long with five to eight sensoria in a row on basal half; IV, 0.55 mm.; V, 0.52 mm.; VI, 1.26 (0.15 + 1.1) mm.; legs rather long; cornicles 0.75 mm. long, slightly swollen on distal half, blackish at tip, with three or four rows of closed reticulations; cauda long, conical, usually very slightly constricted near base.

In Utah this aphid has also been collected at Garden City, June 23; Holden, July 7; and Hurricane, July 11, all during 1925. Only at St George was it found in such numbers as to affect the plant noticeably.

Cotypes in the United States National Museum and in the collection of the writer.

CALLIDIUM PALLIDUM Van Dyke

Since this species was described (Pan-Pacif. Entom., Vol. 4, p. 111, 1928), from two male individuals, a series of eleven specimens consisting of four males and seven females belonging to Mr. H. C. Cain, has been submitted to me by Mr. Gorton Linsley. All of these were reared by Mr. Cain from branches of the redwood, *Sequoia sempervirens* Endl., taken at La Honda, San Mateo County, California, and emerged, indoors, about January 1, 1923. The males are exactly like the specimens previously studied, robust and rufotestaceous. The females are, however, entirely different, not especially robust and of a dark violet color, superficially resembling *antennatum* Newm. The species is thus shown to be the most remarkably dichromatic as well as dimorphic one that I know of among the Callidini. The distinctive features of the female when compared with the females of other blue or violet species, are: the brown pile of the forebody, the narrow prothorax, hardly more than three-fifths as broad as elytra and the very long elytra, an average of 12 mm. as compared with a total length of 16 mm. *Callidium sequoiarium* Fisch., described from the giant sequoia but also found on the coast redwood, is not only sexually unicolorous, but more greenish, more shining, with a proportionally broader prothorax and shorter elytra.—Edwin C. Van Dyke.

A NEW SPECIES OF MELANDRYIDÆ
(COLEOPTERA)

BY RALPH E. BARRETT

University of California, Berkeley, California

***Microscapha californica* Barrett, new species**

Body oval, strongly convex, castaneous. Head deflexed, slightly constricted behind eyes; eyes very coarsely granulate, widely separated on the front, slightly emarginate in front and not prolonged over the insertion of the antennæ; maxillary palpi large, four-segmented, last segment strongly dilated and obliquely truncate at tip, longer than wide; antenna eleven-segmented, first two segments equal in length to segments three to seven inclusive, last four segments dilated forming a well-developed club, first two segments thicker than third. Prothorax twice as wide as long, as wide behind as base of elytra, a slight though distinct margin at sides, base sinuate each side; finely, moderately, closely and irregularly punctate. Scutellum invisible. Elytra convex, sides narrowly inflexed, non-striated, finely, moderately, closely and irregularly punctate, with a single seta arising in each puncture. Abdomen with five ventral segments, basal segment subequal to second at middle. Legs moderately robust; anterior coxæ narrowly separated, large and almost oval; middle coxæ small, moderately separated, with the mesosternum between the coxæ cordiform; hind coxæ small and narrowly separated; hind tibia with two spines on distal end one-half to two-thirds as long as first tarsal segment, serrate on under margin, outer spine slightly longer than inner; tarsi 5-5-4, pubescent, first segment of middle tarsi at least as long as the next two combined, first segment hind tarsi as long as the tibia; tarsal claws simple. Length, 2.5 to 3.5 mm.; breadth, 1.25 to 2 mm.

Holotype (No. 2558, Mus. Calif. Acad. Sci.), and ten paratypes taken by myself from nests of the wood rat, *Neotoma fuscipes* Baird, near Pasadena, California, January 1, 1928. A pair of paratypes will also be deposited in the collection of the California Academy of Sciences.

This is a very distinct species and resembles *Microscapha clavicornis* Lec. by having the base of the prothorax sinuate each side of the middle and the last segment of the maxillary palpi oval, obliquely truncate at apex and longer than wide; and *Lederia arctica* (Horn) by color, invisible scutellum and very coarse granular eyes. It is therefore intermediate between the two genera and as these are the characters used for the separation of the two genera *Microscapha* Lec.¹ and *Crioscapha*

¹ Smiths. Misc. Coll., Vol. 6, No. 167, 2nd. ed. 1866, p. 152.

(Horn),² the latter later found to be a synonym of *Lederia* Reitt., I am suppressing the latter and placing the three known American species in the former genus. In Junk's *Coleopterorum Catalogus*³ four other species of *Microscapha* are given while seven species of *Lederia* are listed. I cannot give the status of the South American and Old World species, but as for the species found in the United States *M. californica* definitely unites them into a homogeneous group.

M. californica also differs from *M. clavicornis* in being castaneous throughout, the latter being black with reddish abdomen, and from *M. arctica* by being in general slightly larger.

Key to the known species of American *Microscapha* Lec.

1. Scutellum visible, base of prothorax sinuate each side; mesosternum between the coxæ narrow; last segment of maxillary palpi oval, obliquely truncate, longer than wide, eyes moderately coarsely granulate.....*clavicornis* Lec.
Scutellum invisible 2
2. Base of prothorax sinuate each side; mesosternum between the coxæ cordiform; last segment of maxillary palpi oval, obliquely truncate, longer than wide; eyes very coarsely granulate.....*californica* n. sp.
Base of prothorax regularly arcuate; mesosternum between the coxæ cordiform; last segment of maxillary palpi oval, squarely truncate, about as wide as long; eyes very coarsely granulate
.....*arctica* Horn

THYCE SQUAMICOLLIS Lec.

Within the last few years there have been taken in the Coachella Valley of California quite a number of what I consider to be but a large phase of *Thyce squamicollis* Lec. They differ in the main from typical specimens from New Mexico, by being larger, often with the first or upper tooth of the front tibiæ not compressed, and by having a very minute secondary punctuation between the normal punctures of pronotum, elytra and abdomen, rarely evident in the other. So far, this species has not been taken in Arizona but no doubt will be. It has been considered the outlying member of one of our typical Pacific Coast genera and the finding of the California specimens of this species binds the straggler still closer to the parent stock.—
E. C. Van Dyke.

² Trans. Am. Ent. Soc., Vol. 26, 1893, p. 144.

³ *Coleopterorum Catalogus*, W. Junk, Part 77 by E. Csiki, 1924, p. 20.

THE SPECIES OF SINODENDRON (LUCANIDÆ)

BY MELVILLE H. HATCH*

Sinodendron is one of those genera that seem to unite the Pacific coast of North America more closely with the Palæarctic region than with other portions of North America. The three species of this genus are known respectively from Europe, the North American Pacific Coast, and Azerbaijan and Trans-Caspia. The larvæ inhabit the decaying wood of the dead and dying trunks, stumps, and logs of various deciduous trees (alder, beech, ash, willow, etc.), but do not appear to injure the living tree.

In the following key the characters of *persicum* are drawn from the original description.

- A.¹ Elytral intervals coarsely punctate; ♂ with transverse pronotal ridge emarginate on either side of median lobe.
- B.¹ Elytral intervals less coarsely punctate. Male: cephalic horn feebly constricted at base; pronotum less coarsely punctate, with large lateral areas caudad to the transverse ridge and the middle line impunctate; lateral protuberances of transverse pronotal ridge less prominent but about equal in width to the median lobe; transverse ridge terminating at anterior angles of pronotum, the sides of the pronotum in front feebly convergent with an evident longitudinal impression. Female: pronotum with conspicuous raised impunctate transverse and longitudinal areas. Europe and adjacent portions of Asia, Caucasus. (*americanum* Beauv., *juvenile* Muls.)
*cylindricum* L.
- B.² Elytral intervals less coarsely punctate. Male: cephalic horn not constricted at base, gradually narrowed from base to apex; pronotum more coarsely punctate, without evidence of impunctate areas in front of transverse ridge and only feebly developed impunctate areas behind the ridge; lateral protuberances of transverse ridge minute; transverse ridge terminating at the side margin of the pronotum well behind apex, the sides of the pronotum in front strongly convergent with a feeble impression behind the ridge. Female: pronotum without transverse impunctate spaces. California to Washington.....
*rugosum* Mann.
- A.² Elytral intervals broad, almost impunctate except at apex.
 Male: transverse pronotal ridge not emarginate on either

* Contribution from the Zoölogical Laboratory of the University of Washington.

side of base of median lobe; cephalic horn strongly constricted at base; pronotum without impunctate area in front of transverse ridge, behind the ridge an extensive impunctate area attaining the sides but not the base, the sides without impressed area. Female: pronotum with transverse impunctate areas. Azerbaijan (Talysh) and Trans-Caspia (Koppeh Dagh).....*persicum* Reitt.

MELLISSODES MYSOPS COCKERELL NESTING IN OREGON (ANTHOPHORIDÆ, HYM.)

BY H. A. SCULLEN

Oregon State Agricultural College

On July 2, 1926, the writer found a colony of *Melissodes mysops* Ckll. nesting in the side of a sand bank at the top of a sea cliff in the Coos Bay region on the Oregon coast. The colony was about fifty feet above the high-water mark on the Cape Argo Lighthouse grounds. It consisted of about sixty individual nests scattered for a distance of about twenty feet along the top of the cliff. Numerous females were seen busily carrying in pollen, while several males were hovering about the openings. Both males and females were taken from nearby thistles (*Cirsium* sp.). Two nests opened showed a collection of pollen, but no evidence of eggs.

On July 13, the colony was again visited. On opening nests half-grown larvæ were found in some, while in others eggs were still present. The nests were visited a third time on July 21. Several larvæ appeared full grown. Very few females were seen. No males were in evidence. A few females were still carrying pollen. Specimens were also taken several miles farther south on the beach cliffs.

As far as the writer has been able to determine, this is the first record of this species for Oregon, and also of its nesting habitat.

Specimens taken were determined by Miss Grace Sandhouse, of the National Museum.

NOTE

The numbers of Volume IV of the *Pan-Pacific Entomologist* were mailed on the following dates: No. 1 on September 16, 1927; No. 2 on December 3, 1927; No. 3 on March 15, 1928, and No. 4 on June 26, 1928.

OBSERVATIONS ON THE CONTROL OF SIERRAN
AÆDES (CULICIDÆ: DIPTERA)

BY STANLEY B. FREEBORN

University of California, Davis, California

Vacationing in the Sierra of California is marred by only one feature of Nature's sense of fitness—the biting flies. Tabanids and biting rhagionids (leptids) are particularly pestiferous, but the crown of thorns is in the possession of the mosquitoes which are almost universal above the 5000-foot line.

These day biting mosquitoes are all members of the genus *Aedes*, the most troublesome ones being *communis tahoensis*, *ventrovittis*, and *hexodontus*. They are known as snow mosquitoes on account of the fact that they breed in pools caused by melting snow. While this is literally true many of them find their optimum breeding places in lakeside or streamside pools that are flooded as a result of rising water only indirectly connected with the melting snow. Others, true to their name, breed at the edge of the snow fields in depressions that hold the water as it trickles from an adjacent snow bank.

All of them, irrespective of their breeding places, emerge from eggs that have been laid the previous summer and remained dormant through the fall and winter. The advent of moisture in the spring is a signal for hatching, the promptness with which this is heeded depending to some extent on the species involved.

The adult after feeding seeks the muddy banks of a favorable breeding pool and oviposits. The eggs are evidently laid over a period of two or three weeks in small numbers, eight to ten eggs at a time. The writer has seen *Aedes communis tahoensis* females ovipositing on a bone-dry mass of mud-stained leaves and twigs that had been dry for over a month. Previous observation had shown it to be a bed of a shallow pool, however, and the next year's observation proved this to be the case again.

Observations and attempts at control have been made during the past two years at upper Echo Lake in El Dorado County, California, at an elevation of 7500 feet. The prevailing mosquito here is *Aedes hexodontus*, a mosquito which prefers relatively deep, semipermanent overflow or seepage pools but which adapts itself to varying conditions and matures equally well in

shallow depressions or even hoof-prints. Its larvæ are easily recognizable in the Sierra as the only ones with the chitinous anal saddle completely surrounding the segment. The adult female is not easily differentiated from its ally, *Aedes communis tahoensis*, the most constant differentiation being the yellow lateral aspect of the mesonotum which is grayish in *communis tahoensis*.

At the western end of the lake there is a moon-shaped area known as Area A, extending back from the shore line for approximately one hundred yards at the center. This whole area is scarcely a foot higher than the high water mark of the lake. The vegetation is a tangled mass of shrubs, and even the slightest depressions hold an appreciable amount of water when the lake is high. Behind this area there arises a granite cliff some twenty to thirty feet high which forms the shoreward boundary of another bench of about equal extent covered with a sparse growth of willows which has sprung up following the burning off of the original pine stand. A meandering stream and poor natural drainage caused by the outcropping of the granite cliff join to form many pools. This will be known as Area B.

Behind this bench the land rises precipitously up the face of another cliff approximately sixty feet in height to flatten out above into a flat valley traversed by a snow stream through a primeval pine forest with tangled bushes immediately bordering the stream. The fall of the stream on this uppermost bench is gentle and there is considerable meandering across the floor of the valley which averages from sixty to seventy-five yards in width. This is known as Area C.

In 1926, Areas A and B were sprayed on May 23 with fuel oil designated as 27°. Spraying was at first limited to those pools showing larvæ, but was finally applied to all pools of standing water in the areas mentioned. No attempt to cover Area C was made. At this time snow was present in small patches at the shore of the lake in sheltered spots, but the majority of the land was bare. Larvæ and pupæ were numerous, but no adults were noticed. A week later, on May 30, the oiled areas were inspected and all larvæ and pupæ were found to be dead. A few adult mosquitoes were present. At the next visit,

on June 11, adult mosquitoes were present in hordes. Attempts to remain out-of-doors unprotected by repellents or nets at sunrise or sunset resulted in torture, and even at midday a stop in the shade resulted in the attack of swarms of vicious biters.

An inspection of the sprayed areas showed no breeding, but the pools of Area C and its extension into the Desolation Valley area showed nearly every pool teeming with pure cultures of *A. hexodontus* larvæ, pupæ, and cast pupal skins. A heavy rain on the 9th of July "retired the side," and the mosquito problem was over for 1926.

In 1927 it was decided to extend our control operations approximately one-half mile into Area C to determine if nearly absolute control for this distance would protect the lake shore. The snowfall was much heavier, and on May 30 no bare ground was visible. On June 20 another trip was made. By this time the snow was in patches but still more plentiful than on May 23 in 1926. Numerous pools were present, and an inspection of these showed some very interesting results. Larvæ were present in large numbers in Area C, which had not been sprayed in 1926, but in Areas A and B no larvæ were present in the pools that had been teeming with immature forms before spraying in 1926. The pools of this area were carefully observed throughout the season and no breeding occurred in any pool that had been sprayed in 1926. In the same areas, however, were a few pools that had been merely soggy areas in 1926 without standing water, but owing to increased snowfall had become pools in 1927. These harbored larvæ, but no pool that had received oil the previous year was found to be infested with mosquito life.

We followed out our program of spraying extending back about a half mile into Area C as planned. Very few adult mosquitoes appeared until July 6 and 7 when they appeared on the lake shore in numbers although not as abundantly as in 1926. Inspection of the area behind the sprayed portion of Area C showed many larvæ of *A. hexodontus* with a scattering of *A. communis tahoensis* in some of the deep pools. The latter were seen in numbers in Desolation Valley some three miles west of the area in question. This species made its appearance among the *hexodontus* adults at Echo Lake during the latter

part of July, but its late appearance was probably caused by its delayed hatching and emergence at its more elevated breeding grounds rather than by the time required to travel the distance involved.

Two resulting observations of the trials are in the one case discouraging and on the other hand encouraging in our attempts to control mountain mosquitoes. The migration of *communis tahoensis* adults from their nearest breeding grounds was over a mile, with little indication that an even greater protected area would be more effective. This information, which has always been surmised, presents a discouraging outlook to the summer homesite or resort owner, who anticipates the possibility of being able to control his mosquito problem. It was noted in the course of the work, however, that the migration of the mosquitoes followed the courses of the streams and the denser vegetation. Homesite lots a few hundred yards from stream beds and cleared of vegetation were often comparatively free from mosquitoes, while areas within a few hundred yards that included water courses and their attendant vegetation were deluged with the pests.

The encouraging feature of the work was the nonappearance in 1927 of larvæ in pools sprayed in 1926. This cannot be explained in any way except that the oil which was noted to stay on the pools for from two to three weeks in noticeable amounts, either repelled ovipositing adults or destroyed them or their eggs at the time of oviposition. This factor was checked in 1927. It was noticeable that the number of hovering adults about the sprayed pools was less than with similar untreated pools which would lend belief to the repellent theory, but it was also true that large numbers of female mosquitoes were found dead on the surface of oiled pools. Possibly the oil repelled the majority and killed the minority that attempted to land on the surface.

On account of the generally discouraging trend of this note it may be fitting to add the results of trials with repellents. During the course of the work we had adequate opportunity to compare the efficiency of various oils and salves as mosquito repellents. The choice was narrowed to the two following:

Bamber oil, which is used in the Orient and is quite effective against anophelines, gave considerable temporary relief. It is a clear yellow liquid and particularly good for allaying the itching from bites already inflicted. Its formula is as follows:

Citronella.....	1½ parts
Kerosene.....	1 part
Cocoanut oil.....	2 parts
Carbolic acid.....	1 per cent

More lasting and more effective was a combination that we have named Sierra Oil. It is a mixture, most of the ingredients of which are used in a preparation called Maine Oil. It has a dark brown color in bulk, but applied to the skin it causes very little, if any, discoloration. One application is effective for approximately one-half hour even in a heavy infestation. Its formula is as follows:

Oil of citronella.....	3 ounces
Spirits of camphor.....	1 ounce
Oil of tar.....	1 ounce
Oil of pennyroyal.....	¼ ounce
Castor oil.....	4 ounces

NEW HOST NOTE FOR PHYMATODES VULNERATUS LEC.

In December 1925, I found in a vacant lot near my home in Oakland, California, a discarded pile of apple branches containing larvæ of cerambycid and buprestid borers. Upon emergence in April and May 1926, the cerambycids proved to be *Phymatodes vulneratus* Lec. According to E. C. Van Dyke and others, the normal host for this species is the broad-leaved maple (*Acer macrophyllum*). Therefore, being interested in this new host, I placed adults of both sexes in a cage containing freshly cut apple branches and found that the females would oviposit on them. However, when placed in a cage containing both apple and broad-leaved maple, only the maple was used, tending to prove that the maple is the preferred host. The adults emerged from both the apple and maple at about the same time, during April and May 1927, showing, as has been recorded before, that their life cycle is one year.—Gorton Linsley.

A MISIDENTIFIED HADRONEMA (HEMIPTERA)

BY E. P. VAN DUZEE

California Academy of Sciences, San Francisco

Our most strongly marked species of *Hadronema* has long stood in my collection, and probably in others, as *robusta* Uhler. The type of that species, from the cape region of Lower California, however, proves to be a *Lopidea* very near to the Texan *wileyæ* Knight, but with the expanded base of the dextral clasper less angulate. The misidentified species may be described as follows:

***Hadronema uhleri* Van Duzee, n. sp.**

Black; pronotum, scutellum, femora and pleuræ bright red. Length, 4-5 mm.

Male. Head with eyes three-fourths as wide as pronotal base; vertex full but hardly tumid, basal carina strong. Segment I of antennæ as long as width of vertex; II nearly four times as long as I; III about three times as long as I; IV two-thirds of I. Pronotum transversely rugose; callosities large, surface depressed between and before them; anterior edge feebly emarginate; sides carinate, slightly sinuate, armed with a stout bristle anteriorly. Elytra nearly parallel. Dextral clasper with a blade-like apex bent at right angles to the stem, its apical margin oblique; sinistral terete, its acute curved apex lying just under the margin of genital segment.

Color black, dull; cheeks at base, loræ, a line next the inner margin of the eyes, collum and anterior margin of pronotum castaneous; posterior lobe of pronotum and lateral carinæ, scutellum, femora, coxæ and pleural pieces mostly, bright red; elytra with a slender hyaline costal line, the marginal vein black; vestiture of fine white scale-like hairs intermixed with longer testaceous ones.

Female stouter; vertex more swollen, pronotum less rugose, callosities concolorous; second antennal segment shorter, castaneous marks on head reduced, red of pronotum and femora brighter.

Described from numerous examples taken by me on white sage in San Diego County from April to June.

Holotype, male, No. 2559, and allotype, female, No. 2560, Mus. Calif. Acad. Sci., taken by E. P. Van Duzee, June 8 and 20, 1913, respectively, at **Alpine, San Diego County, California.**

SOUTHERN CALIFORNIA COLLECTING NOTES

BY A. C. DAVIS

Garden Grove, California

During the spring and summer of 1927 a number of very interesting Coleoptera were taken in various localities in southern California. I have thought it worth while to record these captures, and a number of new or little known facts regarding the habits of these species and the methods of collecting them.

Cactophagus validus Lec. is to be found sparingly under decomposing *Opuntia* at Newport Beach and Laguna from May until September, and probably later. Piles of cactus at the edges of cleared land usually yield specimens of this beetle. The adults are not very active, and usually drop when alarmed. The larva bores in the stalks of the cactus. Several larvæ and pupæ were dug out, and adults have since emerged from these. Associated with this species, but in the more thoroughly decomposed stalks, are three species of *Hololepta*.

Anoplium albofasciatum Linell was taken May 29, in Red Rock Canyon, about thirty-five miles northeast of Mojave. This species is nocturnal, and may be taken by searching the cholla cactus, *Opuntia bigelovii* Engelm., with a lantern. The spines of this cactus are so sharp and thickly set that small insects such as *Hippodamia convergens* are frequently impaled as they attempt to alight, but *Anoplium* seems to have no difficulty. This species is very sluggish, and must be pulled from among the spines with tweezers. Two or three pairs were seen in coitu. This, and a number of fresh exit holes, seem to indicate that the stalks of this cactus are the food plant of the beetle. A very large *Monilema* was taken by Mr. R. E. Barrett the same night on the base of one of the cactus stalks.

Thyce fossiger Csy. was taken in some numbers at Garden Grove, California, flying about the fruit trees at dusk. The punctuality with which these insects appear and disappear is truly remarkable. During the middle of June the appearance of the first *Thyce* can be timed to within three or four minutes or less. Not more than four minutes thereafter the flight is in full swing, and lasts about twenty to twenty-five minutes, when every individual disappears almost at once. The beetles fly very rapidly, and circle about the tops of the trees. The females are relatively scarce.

A NOTE ON THE PARASITISM OF HIPPODAMIA

BY A. C. DAVIS

During the month of July 1927, several cocoons of the ladybird parasite *Dinocampus coccinellæ* (Schrank) were collected from pepper plants, and three or four adults were reared from these. It is stated by those who have had experience with this parasite that the ladybird is fastened to the leaf by the cocoon and cannot get away, although it may live for several days. That there may be exceptions to the rule was shown in one case that came under my observation. The parasitized ladybird, a small *Hippodamia convergens* var. *ambigua* Lec. was still alive and fairly vigorous when found. The cocoon of the parasite was carefully pulled free and placed in a vial. Being curious to see whether or not the ladybird would eventually recover, and not having a second vial at hand, I placed it in the one containing the cocoon, where it raced about with quick, jerky movements that resembled those of a Buprestid more than those of a Coccinellid. Upon encountering the cocoon it settled down upon it and remained motionless.

During the next twenty-four hours the cocoon was taken away from the ladybird several times, and each time the frantic hunt was repeated. When found, the cocoon was grasped in all six legs and turned from side to side, the maxillæ stroking its surface all the while. Being satisfied, the ladybird worked its tarsi firmly into the loose silk of the cocoon and remained motionless, sometimes on its back or side.

The last two or three times the ladybird was weak and had to be persuaded to move. After twenty-four hours it was separated from the cocoon and given a leaf with some aphids upon it, and eagerly devoured a number. From that time on it behaved more normally. When the cocoon was encountered it would be carefully felt over with the maxillæ but not otherwise touched. Though food and an occasional small drop of water were given it, the ladybird died in eight days.

From the above case it appears that the captivity of the parasitized ladybird may be purely voluntary in some cases.

SOME VACATION BITERS

BY E. O. ESSIG

During my regular summer vacation at Upper Echo Lake, altitude 7500 feet, in the El Dorado National Forest of El Dorado County, in July 1927, I captured a number of insects which specialize in making it uncomfortable for the members of the human race who intrude upon their solitary places. Chief of these tormentors is the Tahoe snow mosquito, *Aedes communis* (De Geer) *tahoensis* Dyar, but since it is confidently expected, its pestiferous presence is screened out or brushed aside with only the usual unpublishable comments. There were some others of the dipterous order, however, which brought forth strong speech and violent actions on the part of the human kind. A considerable series of specimens, which were not slapped or otherwise beaten beyond recognition, were taken with the express intention of getting their names and going into print regarding their behavior. They were herded together into a mailing box under the general title of "some vacation biters" and forwarded to Dr. J. M. Aldrich of the National Museum for identification, with the result that they are to be thus publicly exposed.

The leptid flies, *Symphoromyia pachyceras* Williston and *S. atripes* Bigot, share in first place as biters. They are similar in size, shape and color, but the former appears to have a pubescent abdomen while that of the latter is shiny. The length averages from about 4.5 to 6 mm., and the color from bluish gray to black. They assault you anywhere, but prefer to delay the attack until you are comfortably seated in the shade under a tree, or on the porch of or in your cabin. There is a buzz and then a sharp bite before you can bring your free hand into play. They also frequently appear on the trails, but seldom far from the lake shores. I captured a nice series of both species on the windows of my cabin during the latter part of July.

The yellow gnat, *Prosimulium fulvum* (Coquillett), was a close second to the preceding pair, but never so numerous. It struck you on the trails or when you were trying to work with both hands and always got a bite before you could retaliate. It is exceedingly quick to appear; you hear a rather loud buzz and before the noise ceases you know right where to hit, and he

always stays until properly flattened. During the past three years it has indelibly stamped its appearance on my mind, but it was not until this summer that I was sufficiently gentle to secure specimens entire enough to permit of determination. The fly is 4 mm. long, strongly humped, and of an even amber-yellow color with dark eyes.

The deer fly, *Chrysops surdus* O. S., was always blustering around you on the hot trails and seemed to delight in annoying both man and beast. If you took off your hat to let out the steam and to mop off the perspiration, one was sure to scramble in among the hair or search out the bald spot as a place for operations. Another species, however, determined as *Chrysops* sp. near *sordidus* O. S., was even more abundant and troublesome. It is 9 mm. long, shining black, and has the wings heavily clouded with black and two large orange spots on the sides at the base of the abdomen.

Osburn's tabanid, *Tabanus osburni* Hine, is a large velvety black and gray species 12 to 13 mm. long, which will bite if given half a chance, but its large size and loud buzzing make it an easy prey for the suspecting entomologist.

A single specimen of an empid fly, *Rhamphomyia* sp., was so quickly flattened against the back of my neck that I never knew its exact purpose there. After one has become accustomed to dealing with such aggressive and hungry individuals as those already listed, he is not to be blamed if his action is timed slightly ahead of the fly as in this particular case. I shall have some more to tell you about them next fall.

NOTE

An outbreak of the silver-spotted halisidota, *Halisidota argentata* Packard, is now (April 1, 1928), occurring along the Noyo River, near Fort Bragg, Mendocino County, California. The caterpillars are practically full grown and are present in great numbers. They are attacking chiefly the Douglas fir, *Pseudotsuga taxifolia* (Lamb.) and are defoliating young trees.—E. O. Essig.

ON THE WING—A RETROSPECT

BY JAMES E. COTTLE

San Francisco, California

Only recently, I stood one noonday at the intersection of California and Mason streets in San Francisco County waiting for a car. Around and about me roared the traffic of a great city and on all sides arose tall monuments of steel and concrete.

On memory's wing I was transported back in mind to over fifty years ago—fifty-five to be exact. Still standing on the selfsame spot, the same eyes mirroring the selfsame vista as it then appeared, and my heart sank as I looked.

I was then a youngster, scarcely in my teens. Life and the future all before me, like the city of that day and the city of today. Time works its miracles in places as it does in persons. The storied masonry of the present was then of humble magnitude and simple architecture. Where now the marts of commerce rear their heads were open fields and empty lots, the hillsides then unmarked with rails and passing street cars.

And here was where I had in my boyish pranks hunted butterflies. Where now the populace are playing tag and hop, skip and jump with automobiles, and chasing the elusive nimble dollar in the eternal, age-old game of "hide and seek."

A car went by me as I mused, the one I had been waiting for. I let it pass. So wrapped in retrospection, I was powerless to break the spell.

Again I saw myself in later years with net in hand, pursuing lazy, dusty-winged butterflies among the fragrant blue and yellow lupins and remembered that it was in this same locality and on the hillside lying between California, Pine and Stockton streets and Grant Avenue, that dear old Dr. Herman Behr of honored memory had first discovered the larva of *Samia rubra* feeding upon the bushes of the *Ceanothi*, which then flourished there. Search there now for either bushes or butterflies. Not with the Lick telescope will you be rewarded by a trace of either! Like the good Doctor they are of the past.

How vividly do I recall my first activities and virgin efforts in the pursuit of entomology, accompanied and tutored by my esteemed friends, Dr. Behr and G. T. O. Mueller, scientists and gentlemen, if ever there were such, both of whom have long since laid down their nets and crossed the great Ridge, over which we all must ourselves some day pass.

The spots I visited with them and others have been erased forever by the city's growth, and even the collecting grounds in both the suburbs and surrounding counties have been rendered sterile and worthless, from a collector's standpoint by the encroaching real estate man, the golf clubs and their members. Hence it is the golfers, not the gophers, who work havoc and destruction here to scientific research. The beauties of nature are by and through them trampled under foot, destroyed, defiled, eradicated. No architect, however gifted, has successfully competed with the plans of Mother Nature. I have mentioned only one collecting ground of those golden days. To my mind as I am writing come the memories of others, all prolific, all destroyed. They follow:

Mountain Lake, a garden spot of beauty in the close vicinity of the Marine Hospital, covering a radius of two miles and sprinkled over with scrub oak, willows, shrubbery of all kinds, and the fragrant lupin. Here in this little Eden flew the varieties of *Danaïis plexippus*, *Melitæa chalycedona*, *Phyciodes pratensis*, *Colias eurhytheme*, *Chrysophanus helloides*, *Pyrameis atalanta*, *huntera*, *cardui*, *caryæ*, *Thecla melinus*, *augustus*, *dumetorum*, *Lycæna antiacis*, *sagittigera*, *xerces*, *mertila*, *pheres* and *acmon*, *Anthocharis reakirti*, *sara* and *hyantis* and numerous Noctuidæ, Geometridæ and Bombycoïdæ.

Still another beauty spot and dear to the collector's heart was south of Golden Gate Park, that beautiful piece of landscape covering one thousand and thirteen acres, in its five-mile length and breadth of three miles. Much of the same material could have been captured there, but alas, it is now built over and magnificent houses have taken their places. Another fruitful field for the entomologist was the Italian cemetery adjoining the Chinese burying ground and situated in the vicinity of

what is now known as Thirty-third Avenue and Clement Street. Here the golfers reign, and the home and former haunts of *Merolonche lupeni* and *Arctia ornata*, and *ochracea* and many rare Grometridæ are known to them no more.

Still another bounteous butterfly field was that land back of the old Calvary cemetery where flew the rare little *Synanthedon polygona* and *Hepialus sequoiolus*. It was reported that *Satyrus sthenele* was taken there, but as Mueller, Letcher and myself hunted at all seasons of the year and were not successful in seeing one single specimen, I doubt the accuracy of the report.

Another never-to-be-forgotten collecting ground lay in the near vicinity of Lake Merced. One-half mile south of this lake, one early June day I captured, "single-handed and alone," ninety-two *Argynnis callippe*. *Melitæa editha* could there be taken by the hundred, as could also *Papilio hirsuta* in great numbers. The first erasure of this field was caused by the Italian vegetable venders, completed later by the Knights of the Golf Stick.

On the slopes of the hills about a mile south of this lake was a beautiful field, the home of *Arctia edwardsi* and many beautiful Noctuidæ. These slopes are near Ocean View and have partly escaped the intruder, but for how long I know not. On the slopes of the sand hills where now stands St. Joseph's Hospital, in the vicinity of Buena Vista and Park Hill avenues, at present built over by beautiful homes, was another notable spot where I often gathered cocoons of *Samia rubra* by the dozen from the branches of *Rhamnus californica* (Cascara) and larvæ of many species. In crossing the bay to Marin, Contra Costa and other adjacent counties, similar conditions are met with. Many of the old collecting grounds there also have been swept away, but of these fields I will speak later.

In the meantime let us indulge the hope that on the other Shore, wheresoever it be, that Behr, Letcher, Mueller, and in fact all the old collectors who have preceded us across the Great Divide, will have a location picked and nets enough to go around, when we shall join them there—but no golfing.—*Aloha!*

TWO INTERESTING ADDITIONS TO THE
HEMIPTEROUS FAUNA OF
CALIFORNIA

BY E. P. VAN DUZEE

Hypogeocoris slevini Van Duzee, n. sp.

Larger than *piceous* Say. Black, eyes, anterior margin of head and humeral angles of pronotum rufous, a large pale spot on anterior margin of pronotum, elytra pale, legs and rostrum honey-yellow. Length, 4 mm.

Head across the eyes distinctly broader than base of pronotum; black, broadly rufotestaceous anteriorly either side the black tylus; eyes and ocelli red; vertex polished, impressed median line of tylus traceable nearly to base of vertex; ocelli placed midway between the eyes and the median line. Antennæ short and stout, black, sparingly clothed with stiff brown hairs, segment I three-fourths the length of III; II a little shorter than IV. Pronotum two-thirds as long as wide, polished, with a few coarse scattered punctures which omit the large transverse area including the callosities; black with a large lunate area anteriorly and a cloud on each humerus ivory-yellow. Scutellum equilateral, black, with a few large scattering punctures that leave an obscure smooth median line. Elytra subhyaline, honey-yellow, polished, with a few obscure punctures along the veins; thickened scutellar margins of clavus and the ulnar vein medially black; costal membrane expanded, nearly as wide as the clavus; membrane hyaline, veins indistinct. Beneath black, polished, coarsely punctured on the pleuræ; acetabulæ, anterior margin of prothorax, legs and rostrum honey-yellow, the latter with a black line below; anterior femora moderately incrassate, with a row of long stiff hairs below.

Holotype, a unique female, No. 2561, Mus. Calif. Acad. Sci., taken by Mr. L. S. Slevin, October 5, 1919, at **Paraiso Springs, Monterey County California**. This is a very distinct species that cannot be compared with any other known to me.

This insect pertains to genus *Isthmocoris* McAtee for which Montondon had a year earlier founded the genus *Hypogeocoris* with *violaceous* Sign. as type. Unfortunately this paper by Montondon failed to reach me before the publication of my catalogue. The Japanese *Geocoris itonis* Horv. (1905) also belongs to this genus. It is a large and distinct species of which Dr. E. C. Van Dyke took a specimen at Welsohn, Manchuria, September 3, 1923. *Geocoris sonoraënsis* V. D., like *punctipes* Say, is intermediate between this genus and *Geocoris*, having the anterior angle of the pronotum meeting the middle of the eyes.

Dictyssa mira Van Duzee, n. sp.

Unlike any other species known to me; pale greenish; elytra subcoriaceous, brownish with an oblique row of partially hyaline spots marked behind with fuscous, apex fuscous with a marginal row of semicircular pale spots. Length, 4.5 mm.

Male. Characters of head, pronotum and scutellum essentially those of *areolata* Melich. but with the anterior edge of pronotum rather less elevated; elytra thicker and more coriaceous than in the allied species, the hyaline areas but imperfectly transparent; veins thickened but not strongly differentiated.

Color greenish white; clypeus and legs tinged with fulvous; anterior margin of scutellum with a transverse fuscous cloud each side of center; antennæ fuscous or black, a spot above their base and one behind the eye fuscous; elytra pale brown; basal half of costa and the scutellar suture, a row of about five semicircular spots and an oblique vitta, whitish, in places subhyaline; apex of the two larger pale discal areoles blackish and there is a blackish mark at base; apex broadly pale fuscous, the apex of the clavus more or less fuscous.

Female darker, the colors more contrasting, the fuscous on the elytra becoming black in places. Described from ten examples.

Holotype, male, No. 2562, and allotype, female, No. 2563, Mus. Calif. Acad. Sci., and eight paratypes taken by E. P. Van Duzee, August 23, 1924, two miles west of **Mountain Springs, San Diego County, California.**

This is one of the larger species of the genus and very distinct by the more thickened elytra and its greenish white color, with oblique fuscous and pale vittæ, giving it much the aspect of a small Clastoptera.

Desmocerus californicus Horn. Several specimens, both male and female, were taken on the elder (*Sambucus glauca* Nutt.) during the latter part of April in and near Eaton Canyon wash, near Pasadena, California. This species must occur in some numbers near Laguna, as a number of emergence holes were seen in the older trees there. *D. californicus* is one of the few species to which the saying "nothing is rare if you go to the right place at the right time" cannot be applied. In a day of looking over elder trees my largest bag has been eight specimens and a "crick" in the back of my neck. The beetles do not move fast and, once seen, may usually be secured without much difficulty.—A. C. Davis.

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly by the Pacific Coast Entomological Society
in coöperation with the California Academy of Sciences

E. P. VAN DUZEE, Editor

S. B. FREEBORN, Ph.D., Treasurer

The California Academy of Sciences as well as the Pacific Coast Entomological Society has sustained a sad loss in the recent death of Mr. C. L. Fox. Mr. Charles Louis Fox was born at Plymouth, England, June 12, 1869, and died at the home of his brother, Dr. G. R. Fox, in London, England, March 13, 1928. Coming to this country when a young man he was first interested in orange growing at Riverside, California. Later, removing to San Francisco, he became connected with the accounting firm of Price Waterhouse and Company, with whom he remained until the time of his death. After coming to San Francisco he became interested in collecting and studying the butterflies and formed a most excellent collection of our Californian species, neatly mounted on glass Denton mounts. This collection was acquired by the California Academy of Sciences some time ago. About 1920 he took up the collection and serious study of our western Hymenoptera, amassing a large collection of these insects which he left by will to the California Academy of Sciences. His systematic studies were confined to the American Bembecidæ and the genera *Pepsis* and *Nomada*. On the latter genus his studies had only begun when failing health obliged him to relinquish them and to return to England to be with his relatives. Mr. Fox had a most pleasing personality which won him the friendship and love of all with whom he came in contact. A fuller biographical sketch will be published later.

Prof. W. S. Blatchley of Indianapolis was a welcome visitor at the California Academy of Sciences during a part of March and April. While here he sorted over and put in order most of the Academy's collection of Orthoptera.

Mr. H. G. Barber, our well-known hemipterist of Roselle Park, New Jersey, was another welcome visitor in April. During the week or two he spent in San Francisco he found time to make a careful examination of a portion of the Academy's collection of Hemiptera and to do some collecting near this city, including a trip to Yorkville, Mendocino County, as the guest of Mr. E. R. Leach.

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